



414 Nicollet Mall
Minneapolis, MN 55401

December 13, 2021

L-XE-21-009
10 CFR 72.30(c)

ATTN: Document Control Desk
Director, Division of Spent Fuel Management
Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Prairie Island Independent Spent Fuel Storage Installation
Docket 72-10
Materials License No. SNM-2506

Monticello Nuclear Generating Plant
Docket No. 72-58

Independent Spent Fuel Storage Installation Decommissioning Funding Plans

References: 1) Letter from Northern States Power Company--Minnesota to the Nuclear Regulatory Commission, "Independent Spent Fuel Storage Installation Decommissioning Funding Plans", L-XE-18-015, dated December 11, 2018 (ADAMS Accession Nos. ML18345A214, ML18345A215, ML18345A216, ML18345A218, ML18345A219, ML18345A220, ML18345A221)

As holder of the licenses for the Monticello Independent Spent Fuel Storage Installation (ISFSI) and the Prairie Island ISFSI, Northern States Power Company, a Minnesota corporation, doing business as Xcel Energy (hereafter, NSPM), is providing the enclosed updated information to the decommissioning funding plans for the Monticello ISFSI and Prairie Island ISFSI in accordance with 10 CFR 72.30(c). The financial information presented herein is current as of December 2020 for the Monticello and Prairie Island ISFSI's.

Summary of Commitments

This letter makes no new commitments and no revisions to existing commitments.

Martin C. Murphy Digitally signed by Martin C.
Murphy
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Martin C. Murphy
Director, Nuclear Licensing and Regulatory Services
Northern States Power Company – Minnesota

Document Control Desk
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Enclosures (6)

cc: Administrator, Region III, USNRC
Project Manager, Monticello, USNRC
Project Manager, Prairie Island, USNRC
Resident Inspector, Monticello, USNRC
Resident Inspector, Prairie Island, USNRC

ENCLOSURE 1

2021 DECOMMISSIONING FUNDING PLAN FOR THE MONTICELLO AND PRAIRIE ISLAND INDEPENDENT SPENT FUEL STORAGE INSTALLATIONS

These updated Decommissioning Funding Plans are being submitted in accordance with 72.30(c) to reflect adjustments as necessary to account for changes in costs and the extent of contamination and considers the effect of the following events on decommissioning costs such as, spills of radioactive material producing additional residual radioactivity in onsite, subsurface material, facility modifications, changes in authorized possession limits, and actual remediation costs that exceed the previous cost estimate. The plans described below address each of the points required to be included in a Decommissioning Funding Plan as defined in 10 CFR 72.30(b)(1) through (b)(6). Following the Decommissioning Plan descriptions, the required adjustments required by 72.30(c) are summarized.

10 CFR 72.30(b)(1) – "Information on how reasonable assurance will be provided that funds will be available to decommission the ISFSI or MRS"; and,

10 CFR 72.30(b)(4) – "A description of the method of assuring funds for decommissioning from paragraph (e) of this section, including means for adjusting cost estimates and associated funding levels periodically over the life of the facility."

Response

Northern States Power Company, a Minnesota corporation, doing business as Xcel Energy (hereafter NSPM), is a traditional rate-regulated utility. The Monticello Nuclear Generating Plant (MNGP) Independent Spent Fuel Storage Installation (ISFSI) and the Prairie Island Nuclear Generating Plant (PINGP) ISFSI are owned and operated by NSPM. Costs incurred in operating the MNGP and PINGP ISFSIs are recoverable through regulated rates established by the state public utilities commission and the Federal Energy Regulatory Commission (FERC). The recovered costs include the amounts to decommission the MNGP and PINGP ISFSIs.

Under order from the Minnesota Public Utilities Commission (MPUC), NSPM submits a triennial decommissioning accrual filing which includes the current cost estimate for decommissioning MNGP and PINGP, for managing the used fuel stored at MNGP and PINGP until the fuel is removed by the Department of Energy (DOE), for decommissioning the MNGP and PINGP ISFSIs after the used fuel has been removed, and restoration of both sites. Upon review of the decommissioning accrual filing, the decommissioning cost estimate (DCE), the current amount of funding held in the Nuclear Decommissioning External Qualified Trust Fund, and the expected projected interest to be earned on the funds, the MPUC adjusts NSPM's rate of collection to ensure that, at the time that the plants are permanently shut down at the end of their

operating licenses, there is sufficient funding available to accomplish all of the defined activities, including decommissioning of the ISFSIs. This process is repeated every three years to take into account changes in fund earnings, changes in inflation, changes in policy that could impact when decommissioning of the plant or ISFSI might occur, and changes in the estimated costs to decommission the plant and ISFSI.

The triennial decommissioning accrual filing approval by the MPUC and subsequent regulated ratemaking processes in each state jurisdiction that NSPM serves provides reasonable assurance that the money collected to decommission the plants and the ISFSIs will be commensurate with actual costs incurred.

10 CFR 72.30(b)(2) – "A detailed cost estimate for decommissioning, in an amount reflecting: (i) The cost of an independent contractor to perform all decommissioning activities; (ii) An adequate contingency factor; and, (iii) The cost of meeting the § 20.1402 of this chapter criteria for unrestricted use, provided that, if the applicant or licensee can demonstrate its ability to meet the provisions of § 20.1403 of this chapter, the cost estimate may be based on meeting the § 20.1403 criteria."

10 CFR 72.30(b)(3) – "Identification of and justification for using the key assumptions contained in the DCE [Decommissioning Cost Estimate]."

Response

A copy of the most recent triennial decommissioning accrual filing that was made by NSPM to the MPUC in December 2020 is included as Enclosure 2 to this filing. A copy of the most recent DCE for MNGP and its ISFSI (Enclosure 3) and a copy of the most recent DCE for PINGP and its ISFSI (Enclosure 4) that were submitted as part of the triennial decommissioning accrual filing are attached.

Costs and Key Assumptions to Decommission the Monticello ISFSI

The key assumptions used in developing the Monticello ISFSI DCE are:

"3) Fuel will be shipped in the existing NUHOMS DSCs [Dry Shielded Canisters]..."
(Section 1, page 8 of Enclosure 3)

"In accordance with 10 CFR §72.30, licensees must have a proposed decommissioning plan for the ISFSI site and facilities that includes a cost estimate for the plan. The plan should contain sufficient information on the proposed practices and procedures for the decontamination of the ISFSI and for the disposal of residual radioactive materials after all spent fuel, high-level radioactive waste, and reactor-related GTCC [greater than class C] waste have been removed.

"The NUHOMS multi-purpose dry shielded storage canister with a horizontal, reinforced concrete storage module is used as a basis for the ISFSI decommissioning cost

analyses. The modules are assumed to have some level of neutron-induced activation, as a result of the long-term storage of the fuel, i.e., to levels exceeding free-release limits. As an allowance, 8 modules are assumed to require remediation, equivalent to the number of modules required to accommodate the final core offload at the MNGP (484 assemblies). The cost of the disposition of this material, as well as the demolition of the ISFSI facility, is included in the estimates.

"In accordance with the specific requirements of 10 CFR §72.30 for the ISFSI work scope, the cost estimate for decommissioning the ISFSI reflects: 1) the cost of an independent contractor performing the decommissioning activities; 2) an adequate contingency factor; and 3) the cost of meeting the criteria for unrestricted use. The cost summary for decommissioning the ISFSI is presented in Appendix J. It contains four different scenarios reflecting the different number of casks present at the end of the ISFSI operations. The demolition of the ISFSI for all seven scenarios is reflected within the estimates." (Section 3, Page 10-11 of Enclosure 3)

As shown in the Monticello DCE (Enclosure 3) Appendix K page 2, the current cost estimate to decommission the MNGP ISFSI with a 25% contingency factor is \$12,844,000. The previous cost estimate to decommission the MNGP ISFSI provided in the December 11, 2018 (Reference 1) filing was \$14,854,000.

Costs and Key Assumptions to Decommission the Prairie Island ISFSI

The key assumptions used in developing the Prairie Island ISFSI DCE are:

"3) ...Fuel will be shipped in the existing Transnuclear TN-40 casks, plus NUHOMS DSCs for fuel removed after final plant shutdown ..." (Section 1, Page 8 of Enclosure 4)

"In accordance with 10 CFR §72.30, licensees must have a proposed decommissioning plan for the ISFSI site and facilities that includes a cost estimate for the plan. The plan should contain sufficient information on the proposed practices and procedures for the decontamination of the ISFSI and for the disposal of residual radioactive materials after all spent fuel, high-level radioactive waste, and reactor-related GTCC waste have been removed.

"The NUHOMS multi-purpose dry shielded storage canister with a horizontal, reinforced concrete storage module is used as a basis for the ISFSI decommissioning cost analyses. The modules are assumed to have some level of neutron-induced activation, as a result of the long-term storage of the fuel, i.e., to levels exceeding free-release limits. As an allowance, 8 modules are assumed to require remediation, equivalent to the number of modules required to accommodate the final core offloads at Prairie Island (121 assemblies per unit). The cost of the disposition of this material, as well as the demolition of the ISFSI facility, is included in the estimates.

"The existing ISFSI pad, supporting the TN-40 casks, is not expected to be contaminated and will be demolished accordingly after a confirmation survey.

"In accordance with the specific requirements of 10 CFR §72.30 for the ISFSI work scope, the cost estimate for decommissioning the ISFSI reflects: 1) the cost of an independent contractor performing the decommissioning activities; 2) an adequate contingency factor; and 3) the cost of meeting the criteria for unrestricted use. The cost summary for decommissioning the ISFSI is presented in Appendix J. It contains four different scenarios reflecting the different number of casks present at the end of the ISFSI operations. The demolition of the ISFSI for all seven scenarios is reflected within the estimates." (Section 3, Page 11-12 of Enclosure 4)

As shown in the Prairie Island DCE (Enclosure 4) Appendix K page 2, the current cost estimate to decommission the Prairie Island ISFSI with a 25% contingency factor is \$11,121,000. The previous cost estimate to decommission the Prairie Island ISFSI was provided in the December 11, 2018, filing (Reference 1) was \$8,982,000.

10 CFR 72.30(b)(5) – "The volume of onsite subsurface material containing residual radioactivity that will require remediation to meet the criteria for license termination."

Response

Monticello

MNGP utilizes the NUHOMS®-61BTH DSC and horizontal storage modules (HSMs) for pad storage. Each canister is loaded, dried, backfilled with helium gas, sealed (welded shut), and decontaminated inside the plant prior to being placed inside the concrete HSM on the pad inside the ISFSI. The Safety Analysis Report at Appendix T.11.2.8 – DSC Leakage for the NUHOMS®-61BTH DSC states:

"T.11.2.8 DSC Leakage

The NUHOMS®-61BTH DSC is designed as a pressure retaining containment boundary to prevent leakage of contaminated materials. The analyses of normal, off-normal, and accident conditions have shown that no credible conditions can breach the DSC shell or fail the double seal welds at each end of the DSC. The NUHOMS®-61BTH DSC is designed and tested to be leak tight [11.2]. Therefore DSC leakage is not considered a credible accident scenario."

As such there is no source of onsite subsurface material containing residual radioactivity that will require remediation as a result of ISFSI operations and no volume has been assumed in the decommissioning cost estimate for the ISFSI.

Prairie Island

PINGP utilizes the Transnuclear TN-40 and TN-40HT Dry Storage Casks. The casks are loaded, dried, backfilled with helium gas, sealed (bolted shut), and decontaminated inside the plant prior to being placed on the ISFSI storage pad. The Safety Analysis Report, Section 4.6 Decommissioning Plan at page 4.6-2 states:

"4.6 Decommissioning Plan

Due to the leak tight design of the storage casks, no residual contamination is expected to be left behind on the concrete base pad. The base pad, fence, and peripheral utility structures will require no decontamination or special handling after the cask is removed."

As such there is no source of onsite subsurface material containing residual radioactivity that will require remediation as a result of ISFSI operations and no volume has been assumed in the decommissioning cost estimate for the ISFSI.

10 CFR 72.30(b)(6) – "A certification that financial assurance for decommissioning has been provided in the amount of the cost estimate for decommissioning."

Response

Financial assurance to ensure the availability of funds to decommission the MNGP and PINGP ISFSI is being provided by the method prescribed in 10 CFR 50.75 (e)(1)(ii), which states, in part:

"This method [External Sinking Fund] may be used as the exclusive mechanism relied upon for providing financial assurance for decommissioning in the following circumstances: (A) By a licensee that recovers, either directly or indirectly, the estimated total cost of decommissioning through rates established by 'cost of service' or similar ratemaking regulation. Public utility districts, municipalities, rural electric cooperatives, and State and Federal agencies, including associations of any of the foregoing, that establish their own rates and are able to recover their cost of service allocable to decommissioning, are assumed to meet this condition."

This method is allowed under 10 CFR 72.30(e) which states, in part:

Financial assurance for decommissioning must be provided by one or more of the following methods:...(5) In the case of licensees who are issued a power reactor license under Part 50 of this chapter...the methods of 10 CFR 50.75(b), (e), and (h), as applicable.

Enclosure 6 provides the following External Trust Fund Balances as of January 1, 2021, for MNGP, PINGP Unit 1 and PINGP Unit 2 broken down into four subaccounts: 1) Radiological Decommissioning; 2) Spent Fuel Management-Operations; 3) Spent Fuel Management-Decommissioning; and, 4) Site Restoration.

The Tables 1 - 3 below are taken from the table found in Enclosure 6 that separates the operations and radiological decommissioning portions of the spent fuel management costs as of January 1, 2021. These new balances are provided in Enclosure 6.

Table 1*

| Prairie Island Unit 1 | External Qualified Trust |
|---|--------------------------|
| Radiological | \$603,267,045 |
| Spent Fuel Management – Operations | \$85,229,409 |
| Spent Fuel Management - Decommissioning | \$4,168,892 |
| Site Restoration | \$25,286,899 |
| Total | \$717,952,246 |

Table 2*

| Prairie Island Unit 2 | External Qualified Trust |
|---|--------------------------|
| Radiological | \$585,378,397 |
| Spent Fuel Management – Operations | \$151,134,329 |
| Spent Fuel Management - Decommissioning | \$4,282,027 |
| Site Restoration | \$60,943,571 |
| Total | \$801,738,324 |

Table 3*

| Monticello | External Qualified Trust |
|---|--------------------------|
| Radiological | \$761,345,175 |
| Spent Fuel Management – Operations | \$411,082,731 |
| Spent Fuel Management - Decommissioning | \$8,328,692 |
| Site Restoration | \$76,002,116 |
| Total | \$1,256,758,713 |

*Totals may not foot due to rounding.

The MPUC has not yet issued a written order approving the NSPM 2020 decommissioning accrual. An Order from the MPUC issued in April 2021 set an annual decommissioning accrual (Enclosure 5, page 15). The Company has updated the decommissioning cost estimates provided by TLG Services to the most current 2020 versions. These studies are not in contention with any parties in the filing and the Company believes they will be approved as filed. The studies provide the most up-to-date and accurate estimations of the cost to decommission these plants. The Monticello

cost estimate reflects a net decrease over the 2017 estimate, and the Prairie Island study is a net increase; however, the MPUC-ordered accruals have not decreased. The External Qualified Trust remains adequately funded for the activities related to the radiological decommissioning and spent fuel management-decommissioning.

The External Qualified Trust currently holds all funds available for decommissioning.

Assessment of 10 CFR 72.30(c) Adjustments

The accruals approved by the MPUC in the 2021 Order (Enclosure 5) have not decreased from prior approved plan amounts; therefore, prior NRC approval of the 2021 Decommissioning Funding Plan is not required. In developing the cost estimates in the 2021 plan, the events described in 10 CFR 72.30(c)(1) through (c)(4) were considered and are summarized below.

10 CFR 72.30(c)(1) – "Spills of radioactive material producing additional residual radioactivity in onsite subsurface material."

Response

As described in the response to the requirements of 10 CFR 72.30(b)(5) above, the casks at PINGP and canisters at MNGP are sealed and no credible events have been identified that could result in leakage; therefore, there is no source of onsite subsurface material containing residual radioactivity that will require remediation as a result of ISFSI operations and no volume has been assumed in the decommissioning cost estimate for the ISFSIs.

10 CFR 72.30(c)(2) – "Facility modifications."

Response

There have been no facility modifications at the MNGP or PINGP ISFSIs that impact the 2017 versus 2020 cost estimates for ISFSI decommissioning.

10 CFR 72.30(c)(3) – "Changes in authorized possession limits."

Response

The number of casks at PINGP and DSCs at MNGP assumed in the Decommissioning Funding Plan are the number of casks/canisters necessary to support plant operations until the end of the renewed plant operating licenses and those casks/canisters necessary to empty the spent fuel storage pool following plant shutdown including GTCC radioactive wastes. This is greater than the number of casks/canisters currently authorized by the NRC. The NRC authorized possession limits for the MNGP ISFSI has not changed since the last Decommissioning Funding Plan submittal. The NRC authorized possession limit for the PINGP ISFSI was raised by Renewed License

Amendment 11, issued on October 29, 2020 (ADAMS Accession Nos. ML20237F366, ML20237F368, ML20237F367).

10 CFR 72.30(c)(4) – "Actual remediation costs that exceed the previous cost estimate."

Response

No actual remediation has taken place at MNGP or PINGP.

ENCLOSURE 2

**DECEMBER 2020 TRIENNIAL NUCLEAR PLANT DECOMMISSIONING ACCRUAL
FILING TO MINNESOTA PUBLIC UTILITIES COMMISSION**

31 pages follow

STATE OF MINNESOTA
BEFORE THE
MINNESOTA PUBLIC UTILITIES COMMISSION

| | |
|--------------------|--------------|
| Katie J. Sieben | Chair |
| Valerie Means | Commissioner |
| Matthew Schuerger | Commissioner |
| Joseph K. Sullivan | Commissioner |
| John A. Tuma | Commissioner |

IN THE MATTER OF THE PETITION OF
NORTHERN STATES POWER COMPANY
FOR APPROVAL OF THE 2022 - 2024
TRIENNIAL NUCLEAR
DECOMMISSIONING STUDY &
ASSUMPTIONS

DOCKET NO. E002/M-20-____

PETITION

OVERVIEW

Pursuant to Minn. Stat. § 216B.11 and § 216B.2445 and Minn. R. 7825.0500 through 7825.0800, and prior Minnesota Public Utilities Commission (Commission) Orders, Northern States Power Company, doing business as Xcel Energy (Company), submits our Petition for approval of the 2022-2024 Nuclear Decommissioning Study and Assumptions.

The objective of a decommissioning docket is to arrive at a reasonable cost estimate for decontamination and removal of nuclear facilities at the end of their operating lives and to set an accrual to accumulate funds sufficient to pay those decommissioning costs. To meet that objective, in this Petition, we propose a change to our annual accrual designed to result in the accrual of funds necessary to decommission the Company's nuclear fleet.

This triennial filing is unique in two ways. First, it follows our June 2020 Supplemental Filing to the 2019 Integrated Resource Plan (2019 IRP Supplement) in Docket No. E002/RP-19-368, in which we discuss the Company's long-term carbon reduction goals. In particular, our Preferred Plan in the 2019 IRP Supplement includes a 10-year extension of our license to operate the Monticello plant, moving the planned retirement date from 2030 to 2040. If approved, this extension would affect our accrual calculation by extending the time for collecting an accrual during the plant's operation while allowing the Nuclear Decommissioning Trust (NDT) to earn returns during the 10 additional years of operation. Because the extension has

not yet been approved, however—and recognizing there are many regulatory hurdles both at the state and federal levels required for extending operation of the Monticello plant—we have analyzed, but do not propose, potential accruals that account for the extended operation.

Second, this filing follows the decision on our 2020 Stay Out Request.¹ In that docket, the Commission authorized the Company to defer the increase in the accrual that arose out of the 2017 Nuclear Decommissioning Trust Triennial filing (2017 Filing)² from January 1, 2020 to January 1, 2021. It also is being filed shortly after the Company filed its 2020 Multi-Year Rate Plan (MYRP),³ and prior to the Commission’s consideration of our 2021 Rate Case Stay Out Request.⁴ If the 2021 Stay Out Request is approved (and the MYRP is withdrawn), any increase to the NDT accrual arising out of the 2017 Filing would be postponed until January 1, 2022. (As noted in our November 2, 2020 Reply Comments in Docket No. E002/M-20-743, a one-year delay in increasing the accrual from its current \$14 million level would increase the accrual proposed in this Petition by only \$1.28 million annually.) If the 2021 Stay Out Request is not approved and the MYRP proceeds, we would update the MYRP for the NDT changes in Rebuttal Testimony.

In compliance with the Commission’s January 7, 2019 Order on our 2017 Nuclear Decommissioning Trust Triennial filing (2017 Filing) in Docket No. E002/M-17-828, we have analyzed several decommissioning scenarios and calculated a number of different accruals as part of this filing. The resulting range of possible changes to the accrual runs from an \$8.6 million decrease to a \$207.5 million increase. However, in general, when compared to the 2017 Filing and using the same assumptions regarding decommissioning alternatives and operating lives, calculated accruals have increased modestly. For example, if we assume that immediate decommissioning will occur following the end of each current plant license (consistent with our 2014 and 2017 Filings), the accrual for 2022 would increase from \$27.4 million to approximately \$31.4 million.

As discussed below—absent other material intervening events—we believe it is appropriate to increase the accrual to \$31.4 million beginning in 2022. Specifically,

¹ See Commission’s March 13, 2020 ORDER in Docket No. E002/M-19-688.

² See Commission’s January 7, 2019 ORDER in Docket No. E002/M-17-828.

³ IN THE MATTER OF XCEL ENERGY’S APPLICATION FOR AUTHORITY TO INCREASE ELECTRIC RATES, Docket No. E002/GR-20-723 (November 2, 2020).

⁴ PETITION FOR APPROVAL OF 2021 TRUE-UP MECHANISMS, Docket No. E002/M-20-743 (October 1, 2020). Note: The Company’s 2021 Stay Out Request was initially filed on September 15, 2020, as part of the Company’s Response and Petition in the COVID-19 Relief & Recovery dockets (Docket Nos. E,G999/CI-20-492; E,G002/M-20-716). On October 1, 2020 it was given its own docket – Docket No. E002/M-20-743.

the long-term real interest rates (Treasury rate in excess of average future inflation, measured by the rate on Treasury Inflation Protection Securities (TIPS)) is a fundamental building block for the forward-looking return forecast. That rate is lower today than it was in 2017 as a result of a decline in real interest rates. As a result, our current projections show lower long-term investment growth in the future than our projections in the 2017 Filing. This change in our projections is consistent with the investment industry as a whole. Given the very long duration of the NDT and decommissioning process, even modest changes in forward-looking expected return assumptions can have a substantial effect on the accrual. For these reasons, we believe increasing the accrual is appropriate and reasonable.

Based on the above, the Company respectfully requests the Commission:

- Approve our decommissioning study and assumptions as compliant with the Company's obligations under Minnesota statutes, Commission rules, and prior precedent;
- Approve an accrual of \$31,368,901 effective in 2022 to meet the needs of the Company's 60-year spent fuel scenario, with no recasking of the fuel, for 2022 through 2024 while strategic decisions about the future of our nuclear units are decided in our 2019 IRP;
- Approve an annual accrual of \$0.7 million for end-of-life (EOL) nuclear fuel for the calendar year 2022 through 2024; and
- Approve the current asset allocation for the NDT.

Our Petition is organized as follows:

Sections I through IV – *General filing information*

- V. COMPANY PROPOSAL
- VI. REQUIRED DECOMMISSIONING INFORMATION
 - A. Scenarios Evaluated
 - B. Primary Factors Changed Since 2017 Filing
 - C. Trust Structure & Investment Strategy
 - D. Current Fund Balances
- VII. EFFECT OF CHANGE UPON THE COMPANY'S REVENUE
- VIII. EOL NUCLEAR FUEL
- IX. PREMATURE RISK INVESTIGATION
- X. ASSET RETIREMENT OBLIGATION

Supporting Schedules

| | |
|---|--|
| A | Cost Estimate Summary |
| B | Escalation Analysis |
| C | Portfolio Analysis |
| D | Qualified Trust Statements |
| E | Decommissioning Accrual Analysis |
| F | Customer Rate Impact Calculation |
| G | EOL Accrual |
| H | Premature Risk Investigation |
| I | Asset Retirement Obligation |
| J | Decommissioning Cost Analysis for the Monticello Nuclear Generating Plant |
| K | Decommissioning Cost Analysis for the Prairie Island Nuclear Generating Plant |
| L | Decommissioning Cost Analysis for the Monticello Nuclear Generating Plant with a 10-year Operating Life Extension |

I. SUMMARY OF FILING

A one-paragraph summary of the filing accompanies this Petition pursuant to Minn. R. 7829.1300, subp. 1.

II. SERVICE ON OTHER PARTIES

Pursuant to Minn. Stat. § 216.17, subd.3, the Company has electronically filed this document. A summary of the filing has been served on all parties on the attached service list.

III. GENERAL FILING INFORMATION

Pursuant to Minn. R. 7825.3200, 7825.3500, and 7829.1300, subp. 3. the Company provides the following required information:

A. Name, Address, and Telephone Number of Utility

Northern States Power Company
Xcel Energy
414 Nicollet Mall
Minneapolis, MN 55401
(612) 330-5500

B. Name, Address, and Telephone Number of Utility Attorney

Matt B. Harris
Lead Assistant General Counsel
Xcel Energy
414 Nicollet Mall, 401 – 8th Floor
Minneapolis, MN 55401
(612) 330-7641

C. Date of Filing

This Petition is being filed on December 1, 2020.

D. Statute Controlling Schedule for Processing the Filing

Under Minn. R. 7829.0100, subp. 11, this request for approval of decommissioning accrual is a “miscellaneous” filing because no determination of the Company’s general revenue requirements is necessary. There is no specific statute that prescribes the amount of time the Commission has to rule on this Petition.

E. Utility Employee Responsible for the Filing

Allen D. Krug
A.V.P. of Minnesota State Regulatory Policy
Xcel Energy
414 Nicollet Mall, 401 – 7th Floor
Minneapolis, MN 55401
(612) 330-6270

IV. MISCELLANEOUS INFORMATION

Pursuant to Minn. R. 7829.0700, subpt. 2, the Company requests that the following persons be placed on the Commission’s official service list for this matter:

Matt B. Harris
Lead Assistant General Counsel
Xcel Energy
414 Nicollet Mall, 401 - 8th Floor
Minneapolis, MN 55401
matt.b.harris@xcelenergy.com

Lynnette Sweet
Regulatory Administrator
Xcel Energy
414 Nicollet Mall, 401 - 7th Floor
Minneapolis, MN 55401
regulatory.records@xcelenergy.com

Any information requests in this proceeding should be submitted to Ms. Sweet at the Regulatory Records email address above.

V. COMPANY PROPOSAL

In developing the Company's proposed NDT accrual, it is important to consider the timing of this triennial filing. Most notably, we are making this filing while our 2019 IRP, in which we and our stakeholders are considering the long-term future of our nuclear fleet, is pending before the Commission.

In its January 11, 2017 Order in the Company's last IRP, the Commission specifically ordered that the Company describe in its next IRP "its plans and possible scenarios for cost-effective and orderly retirement of its aging baseload fleet, including Sherco, King, Monticello, and Prairie Island."⁵ The 2019 IRP, therefore, addresses several alternatives for our nuclear fleet, including the continued operation of the units through the end of their licensed lives, possible early retirements of one or more units, and/or possible life extensions. Of these alternatives, the Company's Preferred Plan in the June 30, 2020 IRP Supplement proposes to extend the licensed life of the Monticello Plant, leaving the decision of whether to extend the life of Prairie Island (which is currently scheduled to retire several years after Monticello) for the next IRP. Consistent with that direction, we analyzed the impacts of the Monticello extension on the NDT accrual.

Additionally, Schedules J, K, and L thoroughly discuss alternative decommissioning scenarios, including both immediate decommissioning (DECON)⁶ as well as the SAFSTOR⁷ alternative. In fact, the Department raised SAFSTOR as an alternative in our 2015 IRP, noting that it would allow the decommissioning funds to accrue interest following retirement of the plants.⁸ We note that the day before making this filing, we discovered additional review of our modeling of the SAFSTOR alternative scenarios is required. This additional review will not change our recommended accrual, but we expect that it may lower the SAFSTOR alternative accruals. We will

⁵ Docket. No. E002/RP-15-21 (January 11, 2017 Order at 12.)

⁶ DECON is defined by the NRC as, "[a] method of decommissioning in which the equipment, structures, and portions of a facility and site containing radioactive contaminants are removed and safely buried in a low-level radioactive waste landfill or decontaminated to a level that permits the property to be released for unrestricted use shortly after cessation of operations."

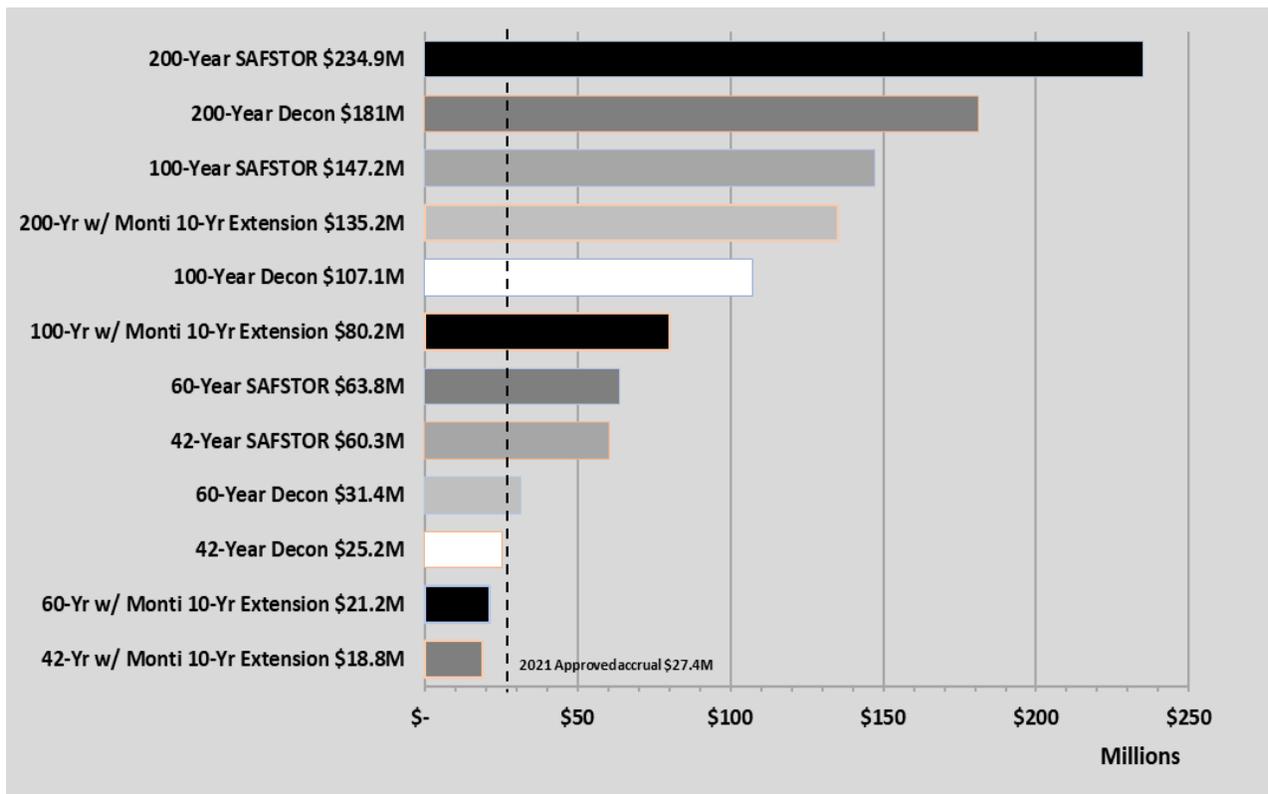
⁷ SAFSTOR is defined by the NRC as, "[a] method of decommissioning in which a nuclear facility is placed and maintained in a condition that allows the facility to be safely stored and subsequently decontaminated (deferred decontamination) to levels that permit release for unrestricted use."

⁸ Docket. No. E002/RP-15-21 (Department's July 8, 2016 Comments at 37-38).

file a supplement to this Petition with revised schedules based on the updated SAFSTOR calculations.

These two decision points—how long to operate the plants and how to decommission them—could have a dramatic impact on the accrual calculation for the NDT. The following table shows the potential accrual amounts under various scenarios involving the length of time Monticello runs, the method of decommissioning, and the amount of time the spent fuel is stored in Minnesota.

Table 1 – Nuclear Decommissioning Triennial Accrual Alternatives



In preparation for this Petition and setting our proposed accrual, we analyzed a variety of decommissioning scenarios and calculated a number of different accruals for the Commission. We discuss these various scenarios below. We also set forth all of the information required by the relevant statutes, Commission rules, and past Commission Orders.

Based on our review of these scenarios, we recommend increasing the annual accrual to \$31.4 million—the 60-year DECON Scenario identified in Table 1 above. The overall goal of the decommissioning accrual schedule is to ensure that the customers who benefit from nuclear power pay all the costs associated with that power at the

time it is generated—including the costs to eventually decommission the plants. We believe our proposal to increase the currently approved accrual to \$31.4 million is reasonable because it is consistent with past decisions setting accruals.

Although we considered accrual scenarios based on the extension of the Monticello operating license, we do not recommend adopting an accrual based on those scenarios at this time. We make this recommendation because the 2019 IRP remains pending, and the status of the Monticello extension is uncertain. Additionally, extending the license for Monticello requires obtaining additional regulatory approvals, including securing a Subsequent License Renewal from the Nuclear Regulatory Commission (NRC) and a Certificate of Need for additional spent fuel storage from the Commission. In light of these uncertainties, we believe it is most appropriate at this time to set the accrual based on a scenario that does not include a license extension. We note, however, that were we to account for the Monticello extension, the annual accrual could drop to \$21.2 million. Moreover, should the extension ultimately be approved, the accrual can be adjusted accordingly at a later date.

Finally, we propose to continue the assumption that the Department of Energy will continue to provide refunds for dry cask storage during the decommissioning process, as approved by the Commission in its March 20, 2020 Order in Docket No. E002/M-17-828

We believe this proposal is reasonable and represents the best path forward, while recognizing other decisions the Commission may make would require us to update the proposed accrual in the future. The remainder of this Petition presents the information and analyses that are required by statute, Commission rules, and past Commission Orders for triennial filings.

VI. REQUIRED DECOMMISSIONING INFORMATION

A. Scenarios Evaluated

Consistent with previous filings, the Company examines the impact of assumptions in (1) the engineering cost estimate; (2) costs associated with spent fuel storage following plant shutdown; (3) inflation and escalation; (4) earnings rates; (5) fund investment structure; and (6) recovery period.

As required by Minn. Stat. § 216B.2445, the Company provides scenarios assuming spent fuel will be stored in the State for 60 years, 100 years, and 200 years following cessation of operations at the plant. We include a 60-year scenario without recasking as our base case. This scenario is supported by the NRC evaluation and conclusion

that casks can safely store spent fuel for a minimum of 60 years and assumes replacement after 100 years. We discuss this assumption further in Part B.1.b.ii below. However, pursuant to the Commission's Order in our previous Triennial Nuclear Decommissioning Accrual filing, we have also provided 100-year and 200-year scenarios that include the cost of recasking every 50 years.⁹ In addition, we are including a scenario that assumes spent fuel will be stored in the state for only 42 years. The scenarios discussed above have been provided using the immediate decommissioning (*i.e.*, DECON) scenario for decommissioning, which is consistent with what was provided in the 2017 Filing. In addition to these four DECON scenarios, the Company has provided delayed removal and dismantling (*i.e.*, SAFSTOR) scenarios assuming the same durations as the DECON scenarios. These two alternatives are discussed in Schedule A, which lays out the annual cash flows, as well as the cost estimate report provided by TLG Services, Inc. (TLG) in Schedule J for Monticello, Schedule K for Prairie Island, and Schedule L for the Monticello 10-year license extension.

The decommissioning accrual is an annuity calculation based on the yearly expenditures, in nominal dollars, provided for each cost estimate scenario. The cost estimate is jurisdictionalized for Minnesota retail customers using 72.9219% as presented in the current Minnesota rate case.¹⁰ The escalation rate is used to inflate the jurisdictional cost estimate to future years, and the earnings rate represents the expected return of the fund. Then, an annuity payment is calculated such that, when added to the current fund balance and grown at the forward-looking after-tax expected return, it will result in an estimated fund balance sufficient to satisfy the estimated dismantling costs.

In total, the Company includes twelve accrual scenarios in this Petition. Eight are based on the DECON assumption. Four are based on the SAFSTOR assumption. Within each of these assumptions, we include scenarios for a 42-year, 60-year, 100-year, and 200-year dry cask storage operational period. All scenarios assume an accrual change in 2022. The accrual scenarios are presented in Schedule E.

⁹ *In the Matter of Northern States Power Company's for Approval of the 2016-2018 Triennial Nuclear Plant Decommissioning Accrual*, Docket No. E002/M-14-761, ORDER APPROVING NUCLEAR DECOMMISSIONING STUDY, ASSUMPTIONS, AND ANNUAL ACCRUAL, AND SETTING FILING REQUIREMENTS (October 5, 2015).

¹⁰ *IN THE MATTER OF XCEL ENERGY'S APPLICATION FOR AUTHORITY TO INCREASE ELECTRIC RATES*, Docket No. E002/GR-20-723 (November 2, 2020).

B. Primary Factors Changed Since 2017 Filing

The decommissioning analysis includes three discrete steps. The first is to determine a decommissioning cost estimate for a specific scenario.¹¹ The second is to determine the forward-looking expected-return estimate and escalation rate for the NDT. The forward-looking expected return is based on the investment mix over the relevant time period and includes an analysis of the expected returns on various asset classes and changing investment strategies based on when liquidity would be needed to cover decommissioning costs. The third step is to calculate an annual accrual necessary to fully fund the costs of decommissioning for each site based on the escalation rates and earnings estimates developed for the chosen scenario.

This section of the Petition examines the three primary drivers that contribute to changes in the amounts needed for decommissioning at the expiration of the plants' current operating licenses:

- *Changes to the engineering and other cost estimates.* We revised the engineering cost estimates, to transfer spent fuel from the pool to the Independent Spent Fuel Storage Installation (ISFSI) within 4 years of shutdown, rather than the 5 years previously used. This change reflects the Company's belief that the 5-year assumption was an overly conservative estimate, as industry peers are currently transferring spent fuel in as few as 2–3 years following plant shut down.
- *Changes in assumptions about escalation/inflation of costs over time.* We utilized two escalation/inflation rates: one for the labor cash flows and one for the non-labor cash flows;
- *Revisions to the forward-looking expected returns.* We applied two earnings rates: one for the operation period and another for the post shutdown period.

A detailed discussion of each of these primary drivers is provided below.

1. *Engineering and Other Cost Estimates*

Our consultant, TLG Services, Inc. (TLG), performed site-specific cost estimates for the twelve scenarios noted above (eight fuel scenarios for DECON and four fuel scenarios for SAFSTOR for each of the two sites). Schedules A.1-A16 show TLG's schedules of annual expenditures for each of the scenarios individually. A more complete comparison of the cost estimates between the previous filing and this filing is provided in Schedule A.

¹¹ In all scenarios, it is assumed that the site is fully dismantled, radiologically decontaminated, and restored.

In addition to the cost estimates from TLG, the Company has provided a calculation of the NRC minimum funding amount applicable to the Company's facilities in Schedule A. The NRC minimum is a calculation of a generic cost to decommission based on the output of a unit and is calculated using a formula specified by the NRC. It is not intended to be a site-specific estimate of decommissioning, as it does not address site-specific issues. Instead, the NRC uses this as a gauge of the minimum level of funding a licensee must have to meet the NRC's funding assurance requirements of future decommissioning. Consistent with prior filings, the Company does not use the NRC minimum to determine the need for future decommissioning funding, but we provide it as a comparison data point for analysis. All the cost estimates from TLG are greater than the NRC minimum calculations, thus the accrual we propose is designed to fund more than the NRC minimum.

The decommissioning cost estimate is driven by two primary factors: the choice of decommissioning alternative for the radiological removal of the plant and the duration of fuel storage on site after operations. We discuss each in turn below.

a. Decommissioning Alternatives for Radiological Removal

The alternative chosen for the removal and decontamination of the radiological components of the nuclear plant can vary the timing of when the costs are incurred from early in the decommissioning timeframe for DECON to almost 50 years after operations cease for SAFSTOR. The annual costs associated with the radiological decommissioning alternative are similar across all the different spent fuel storage scenarios that are provided. For example, with the DECON method, the radiological removal costs are the same for the 42-year, the 60-year, the 100-year, and the 200-year spent fuel storage scenarios. Thus, the duration for storing spent fuel remaining on site does not affect the annual costs for the radiological decommissioning.

In addition to DECON scenarios, the Company has evaluated and provided SAFSTOR scenarios, in light of a significant number of plants using the SAFSTOR method. Of the nuclear plants in decommissioning, 10 sites are in SAFSTOR, 10 are in DECON, and 7 are complete and categorized as ISFSI-only. Many of these plants have stated, however, they do not intend to take the full 60 years but will finish decommissioning when economically viable. As noted above, we have discovered additional review of our modeling of the SAFSTOR scenarios is necessary, and we will provide updated analysis in a supplement to this Petition.

Regardless of the decommissioning option, we anticipate the plant will put all of its used fuel into dry storage containers and move it to the ISFSI within the first four years following shutdown. This could occur even faster as technology continues to

evolve. For example, Oyster Creek and Pilgrim nuclear plants, which shut down in 2018 and 2019 respectively, plan to have their used fuel moved to ISFSI less than 3 years after shutdown according to information supplied by their owner, Holtec International.

With either method, once the fuel has been moved to dry casks, the spent fuel pool and supporting systems can be dismantled, meaning that the pool can be drained and supporting equipment can be de-energized and secured. For SAFSTOR, the plant is then left intact during the dormancy period. During this time, there is a 24-hour security force, and maintenance of security systems along with lighting, building maintenance, ventilation and radiation monitoring programs. This dormancy period allows for an eventual reduction in worker dose rates during decommissioning as systems are allowed to decay before full dismantlement. It also results in a reduction in radioactive waste volumes at time of full dismantlement, which results in cost savings.

b. Period that Spent Fuel Could Potentially Remain Onsite

The second issue that influences the overall cost estimate is the duration of fuel storage after shutdown and the procedures in place for the handling of spent fuel. These include the period spent fuel remains in the pool, the period the fuel is stored onsite, and whether the fuel has to be moved to a second cask while stored onsite.¹²

As with all decommissioning cost estimates, the dismantlement and removal of contaminated structures cannot be completed until all spent fuel has been removed from the reactors and storage pools and placed in dry storage containers in the ISFSI. Final release of the site from all licenses will occur once all of the fuel is removed from the onsite storage facility and the storage facility itself has been removed. The differences between the 42-year and 60-year scenarios and the 100-year and 200-year scenarios are in part related to the storage facility operational period and whether the fuel storage scenario included costs to replace spent fuel dry storage casks every 50 years (*i.e.*, recasking). In our spent fuel scenarios, the 42-year and 60-year scenarios do not include recasking. The 100-year and 200-year scenarios include recasking every 50 years. Our recasking assumptions are discussed further in Part c below.

¹² In our last triennial nuclear decommissioning filing, the Commission ordered that the Company provide a more detailed break out of “spent fuel management” costs in future decommissioning filings. In reference to this request the Company first notes that the engineering cost estimate provided in this filing contains tables 3.1-3.7 containing the costs assigned to spent fuel management by cost category and year for all seven scenarios. The cost estimates also provide a narrative discussion regarding what these costs include in section 2.1.4.

In developing the strategy for spent fuel shipping for the 60-year, 100-year, and 200-year scenarios, a key assumption is that all fuel would be shipped from one site first (Prairie Island) followed by the second site (Monticello). Allocations of space for shipping to a federal facility are provided on a company-wide basis, and the Company has the discretion to ship spent fuel from either site first, or both sites at the same time. If spent fuel were shipped from both sites at the same time, both ISFSIs would have to operate for the entire time period following shutdown, *i.e.* 60 years, 100 years, or 200 years. By completing shipping from one site first, overall costs would be lowered because the costs of operating and securing the first site’s ISFSI are eliminated approximately 13 years earlier.

However, the 42-year scenario assumes shipping from both sites simultaneously, resulting in the Prairie Island ISFSI operating until 2064 (31 years after plant shutdown) and the Monticello ISFSI operating until 2062 (32 years after plant shutdown). Table 2 below depicts the years that spent fuel shipping will begin and finish for the 42-year, 60-year, 100-year, and 200-year scenarios. The fuel shipping commencement and completion dates do not change because of the decommissioning alternative chosen or whether recasking is performed.

Table 2 – Spent Fuel Shipping Schedules

| Plant | Year Shipping Begins | Year Shipping Finishes |
|--|-----------------------------|-------------------------------|
| 42-year Scenario | | |
| Prairie Island | 2027 | 2064 |
| Monticello | 2042 | 2062 |
| 60-year Scenario (recasking or no recasking) | | |
| Prairie Island | 2053 | 2077 |
| Monticello | 2078 | 2090 |
| 100-year Scenario | | |
| Prairie Island | 2093 | 2117 |
| Monticello | 2118 | 2130 |
| 200-year Scenario | | |
| Prairie Island | 2193 | 2217 |
| Monticello | 2218 | 2230 |

These shipping schedules are informed by two sets of activities that are occurring at the national level. The first is the status of federal and private storage initiatives, permanent or temporary and the second is the NRC’s Continued Storage of Spent

Nuclear Fuel rule which went into effect on October 20, 2014.¹³ Each is discussed in greater detail below.

i Status of Federal and Private Storage Initiatives, Permanent or Temporary.

Licensing of Yucca Mountain. The application to license the Yucca Mountain permanent repository remains pending before the NRC, following the unsuccessful attempt by the Obama Administration to terminate the proceeding and withdraw the application. The NRC Staff's technical and environmental reviews have been essentially completed, but the adjudicatory hearings on the application before the NRC Atomic Safety and Licensing Board remain suspended pending Congressional appropriations for both DOE and NRC. Numerous contentions submitted by Nevada and other opponents remain to be litigated and must be resolved before the NRC can license the project. The Administration did not include any funding for Yucca Mountain in the FY2021 budget proposal but included \$27 million to explore interim storage of waste at other sites. This bill is the first in recent years to not include any funding for Yucca Mountain, (compared with \$116 million in the FY 2020 and \$120 million in the FY 2019 budgets for both interim storage and Yucca Mountain). The reversal of the Administration's position is thought to be for political reasons. On July 13, 2020, the House Appropriations Committee adopted funding similar to the Administration's proposal and authorized \$27.5 million for interim storage only. The full House passed the bill by a vote of 217-197 on July 31, 2020. Any differences between the House and Senate bills will need to be resolved in conference. Current FY2021 funding is ongoing but it is unlikely there will be Yucca Mountain funding.

Consolidated Interim Storage. Away-from-reactor spent fuel storage as contemplated in the Nuclear Waste Policy Act (known as "Monitored Retrievable Storage") has not been part of the DOE's program since the early 1990s, though it remains in the NWPA. Three private initiatives are discussed below.

Private Fuel Storage Initiative

The Company pursued interim spent fuel storage with an eight-utility consortium Private Fuel Storage (PFS) project in Utah. PFS proposed to build a spent fuel storage facility on the West Central Utah reservation of the Skull Valley Band of

¹³ A copy of the Federal Register Notice which published the final NRC rule entitled, "Continued Storage of Spent Nuclear Fuel" dated September 19, 2014 can be found at the following web location: <http://www.gpo.gov/fdsys/pkg/FR-2014-09-19/pdf/2014-22215.pdf>

Goshute Indians. PFS and the Skull Valley Band entered into a lease in December 1996 that allowed for temporary storage of spent fuel for both the Prairie Island and Monticello plants.

The license application for the PFS Project was submitted to the NRC in June 1997. In February 2006, the NRC issued PFS a license for the interim storage facility. In September 2006, the U.S. Department of the Interior (DOI) disapproved the lease between PFS and the Skull Valley Band and at the same time denied PFS a right-of-way across federal land for the transport of spent fuel to the Skull Valley Reservation. In July 2010, the U.S. District Court for the District of Utah found that the DOI decisions were arbitrary and capricious for not properly considering evidence in the record and improperly relying on evidence outside of the record. The court vacated the DOI decisions and remanded the PFS's right-of-way application and lease to the DOI for further consideration, which was not initiated.

The State of Utah and a group opposed to the PFS Project appealed the NRC's license issuance for the PFS facility to the D.C. Circuit. The appeal was administratively terminated by the Court on its own motion in April 2018, without prejudice to the reopening of the case by any party. Even if the lease were approved and the right-of-way granted, the project must still overcome significant hurdles.

Because of the lengthy approval process that PFS experienced, companies who were initially interested have instead constructed onsite dry fuel storage facilities. A decision to revive the PFS project would depend on the outcome of the DOI's reconsideration, the judicial challenge at the D.C. Circuit if reinstated, continued opposition in Utah, and on sufficient interest and commitment to use the facility by companies with spent fuel, none of which is currently apparent.

Interim Storage Partners (ISP) Consolidated Interim Storage Facility

A centralized interim storage project was initiated by Waste Control Specialists (WCS) for a site in Andrews County, Texas, adjacent to WCS's existing low-level radioactive waste and hazardous waste storage and disposal facilities. The NRC license application for this project was filed in April 2016. In April 2017, WCS asked the NRC to suspend the review of this application. Subsequently, WCS and Orano USA (formerly Areva Nuclear Materials) formed a joint venture to license the facility. In response to letters to the NRC in June and July 2018 from the joint venture ISP, the NRC restarted its review of the application. In response to NRC's August 2018

notice of opportunity for hearing, a number of environmental and other organizations sought to intervene in the NRC proceeding. At about the same time, two organizations moved the Commission to reject the application (and the Holtec application described below), alleging that the NRC lacked the jurisdiction to consider the application. After the Commission denied those requests, one of the organizations appealed to the U.S. Court of Appeals for the D.C. Circuit on December 27, 2018. On June 13, 2019, in considering the NRC's motion, the Court dismissed the case as not ripe for judicial review. On August 23, 2019, the Atomic Safety and Licensing Board considered the hearing requests, admitted one contention submitted by one of the petitioners, and dismissed the remaining contentions and petitioners. A subsequent Licensing Board decision dismissed this contention as moot and rejected an attempt to amend the contention. The Board also dismissed another petitioner's late-filed contention. Appeals from the August 2019 Board decision remain pending before the Commission, and a late-filed contention submitted by one of the petitioners remains pending before the Board. The NRC's recently revised schedule for the environmental review shows a final EIS by July 2021.

Holtec HI-STORE Consolidated Interim Storage Facility

Holtec International has proposed the HI-STORE Centralized Interim Storage Facility for a site in Eddy and Lea Counties in southeastern New Mexico. Holtec filed an application with the NRC for this facility in March 2017. As noted above, a number of environmental and other organizations challenged the application, and following extensive proceedings in front of the NRC, Atomic Safety and Licensing Board, and in courts, the NRC's recently revised schedule for the environmental review shows a final EIS by July 2021.

ii. NRC Continued Storage of Spent Nuclear Fuel Rule

Historically, Waste Confidence has been the NRC's generic determination regarding the environmental impacts of storing spent nuclear fuel beyond the licensed life for operation of a nuclear power plant. This generic analysis has been incorporated into the NRC's reviews under the National Environmental Policy Act for new reactor licenses, license renewals, and ISFSI licenses through the Waste Confidence Rule. On June 8, 2012, the U.S. Court of Appeals for the DC Circuit found that some aspects of the Waste Confidence Rule did not satisfy the NRC's National Environmental Policy Act obligations and vacated the rulemaking.¹⁴ The court indicated that, in making either a Finding of No Significant Impact based on an Environmental

¹⁴ *New York v. NRC*, 681 F.3d 471 (D.C. Cir. 2012)

Assessment or in an Environmental Impact Statement, the NRC needed to add additional discussions concerning the impacts of failing to secure permanent disposal for spent nuclear fuel, and concerning the impacts of certain aspects of potential spent fuel pool leaks and spent fuel pool fires.

In response to the court's decision, the NRC suspended final licensing decisions on new reactors, reactor license renewals, and spent fuel storage facility renewals. The NRC subsequently directed its staff to develop a new rule within 24 months.

On Sept. 6, 2012, the NRC Commission directed NRC staff to proceed with a Generic Environmental Impact Statement (GEIS) to analyze the environmental impacts of continued storage, address the issues raised in the Court's decision, and update the rule in accordance with the analysis in the GEIS. The final rule and GEIS was renamed from "waste confidence" to "continued storage of spent nuclear fuel" in response to public comment to more accurately reflect the nature and content of the rule. The GEIS and final rule effective October 20, 2014, implemented the Commission's direction.

The rule does not authorize, license or otherwise permit nuclear power plant licensees to store spent fuel for any length of time. Rather, the continued storage rule adopts the findings of the GEIS regarding the environmental impacts of storing spent fuel at any reactor site after the reactor's licensed period of operations. As a result, those generic impacts do not need to be re-analyzed in the environmental reviews for individual licenses. The GEIS analyzes the environmental impact of storing spent fuel beyond the licensed operating life of reactors over three timeframes: for 60 years (short-term), 100 years after the short-term scenario (long-term) and indefinitely. However, availability of a deep geologic repository within 60 years is commented on by the NRC in the Federal Register Notice of the Rule where it states on page 56,254:

The United States national policy remains disposal of spent fuel in a geologic repository, and, as stated in the GEIS, the NRC believes that the most likely scenario is that a repository will become available by the end of the short-term timeframe (60 years beyond the licensed life for operation of a reactor).

The possibility of even longer service times is supported by the evaluations performed in the NRCs NUREG-2157, Generic Environmental Impact Statement for Continued Storage of Spent Nuclear Fuel. Under the renewed ISFSI licenses, cask monitoring and maintenance activities are reviewed and approved by the NRC and provide reasonable assurance the casks will continue to store used nuclear fuel safely for a minimum of 60 years.

In NUREG- 2157, “The NRC assumes the replacement of dry casks after 100 years of service life, however, replacement times will depend on actual degradation observed during continued regulatory oversight for maintain safety during continued storage.”

c. Recasking Assumptions

We believe it is reasonable and appropriate to assume that no recasking will be necessary for either the 42-year or 60-year scenarios. Recent activities by the NRC indicate that cask life is at least 100 years or longer. This is supported by the NRC’s recent actions to process the renewal of the licenses of multiple ISFSIs,¹⁵ including for Prairie Island, a total operation period of 60 years (a 20-year initial license plus a 40-year renewal) of operation. Under the renewed ISFSI licenses, cask monitoring and maintenance activities are reviewed and approved by the NRC and provide reasonable assurance that the casks will continue to store used nuclear fuel safely for a minimum of 60 years.

In addition, in the Generic Environmental Impact Statement for Continued Storage of Spent Fuel published in NUREG-2157 in September 2014, the NRC states, “The NRC assumes replacement of dry casks after 100 years of service life; however, replacement times will depend on actual degradation observed during continued regulatory oversight for maintaining safety during continued storage.” Taken together, we believe these findings support our assumption that no recasking will be necessary under the 60-year scenario. We further note that the large step up in the accrual for any scenarios with recasking is primarily due to the recasking assumption that is included in the cost estimate.

The Prairie Island site specific ISFSI license (SNM-2506), which permits storage of the TN-40 casks, was issued in 1993 for a 20-year period. The associated Safety Analysis Report (SAR) described a minimum design life of 25 years. The Company subsequently applied for, and the NRC granted, a renewal of license SNM-2506 for an additional 40 years through 2053. As part of the license renewal process, a review of Time-Limited Aging Analyses (TLAA) and the Aging Management Review (AMR) of the ISFSI systems, structures, and components were conducted. TLAA reviews identified analyses that were required to be performed to demonstrate intended functions would be maintained during the period of extended operation. AMRs identified aging effects/mechanisms that could adversely affect the ability of the systems, structures, and components to perform their safety functions during the period of extended operation and the application identifies an acceptable aging

management program to be implemented prior to the period of extended operation at the site. The NRC Staff reviewed the AMRs and the Aging Management Programs proposed by the Company and added license conditions reflecting the Aging Management Programs.

The Monticello ISFSI casks are authorized by Certificate of Compliance 72-1004 which permits the use of each cask for 20 years from the date it is placed into service. The associated SAR described a service life of 50 years. The general license holder (TN Americas LLC) has subsequently applied for a renewal of Certificate of Compliance 1004 for an additional 40 years. This application is pending NRC approval. As part of the license renewal process, a review of TLAA and the AMR of the ISFSI systems, structures, and components was conducted. TLAA reviews identified analyses that were required to be performed to demonstrate intended functions would be maintained during the period of extend operation. AMRs identified aging effects/mechanisms that could adversely affect the ability of the systems, structures, and components to perform their safety functions during the period of extended operation, and the application identifies an acceptable aging management program to be implemented prior to the period of extended operation at the site. The application included SAR markups to modify the service life to 60 years.¹⁶

Based on TLAA and AMRs that have been performed, experience to date and continuation of approved aging management programs to ensure that monitoring and maintenance are adequately performed, the Company believes it is reasonable to assume the licenses and Certificates of Compliance may eventually be renewed for an additional 40 years, or longer.

d. Technical and Regulatory Barriers to Transporting Spent Fuel

There are no technical or regulatory barriers to transporting spent fuel. The NRC regulates the transportation of commercial spent nuclear fuel in accordance with 10 CFR Part 71 – Packaging and Transport of Radioactive Material. Over the past 30 years, the DOE, NRC and the nuclear industry have safely completed approximately 3,000 shipments of spent nuclear fuel and high-level waste. There is also extensive worldwide experience with spent nuclear fuel transportation: more than 70,000 metric tons of uranium of spent nuclear fuel has been safely shipped in the past 25 years, including all the fuel from the Company’s decommissioned Pathfinder nuclear plant

¹⁶ The manufacture warranty states the design of the casks shall conform and comply with the applicable NRC requirements for 20 years. The warranty on the material and services typically applies for 2- 5 years from the date of services or material delivery.

in South Dakota and 1,058 fuel assemblies from the Company's Monticello Nuclear Generating Plant to a storage facility in Morris, IL This is equal to the amount the DOE will ship to a permanent repository as authorized in the Nuclear Waste Policy Act. Barriers are largely political and at the state level along the proposed transportation routes. DOE continues to provide funding to work on the potential transportation barriers such as public education and emergency planning along the transportation routes.

Under contract with DOE, nuclear plant operators are required to prepare spent fuel for shipment to DOE. To ship spent fuel the nuclear plant, operators are required to place the fuel in NRC-approved containers for transportation. The casks used for storage at Monticello and Prairie Island also will be used for transportation, and there will not be a need to move spent fuel from their current storage container prior to transport. The actual transportation will be the responsibility of DOE. To accomplish this, title and liability for the spent fuel will be transferred to DOE when the spent fuel transportation container crosses the nuclear-plant site boundary and is in the possession of DOE.

In addition, as described above, two private companies are moving through the NRC licensing process to open centralized interim storage facilities and would transport fuel using a private shipment model. The Company continues to lead important initiatives to prepare the industry and work with stakeholders to move used fuel either to interim or permanent storage facilities.

- e. Industry decommissioning status and use of third-party contractors

In compliance with Order Point 10 of the Commission's January 7, 2019 Order regarding the 2017 Filing, we provide this information regarding the use of third-party contractors for decommissioning the Prairie Island Nuclear Generating Plant.

The Zion plant in Illinois has been going through decommissioning under the responsibility of a third-party contractor, EnergySolutions (*i.e.*, ZionSolutions), which began decommissioning the plant in 2010. All of the above-grade plant structures at Zion have been removed. Radiological final status surveys and site restoration was completed in 2020. These results are significant because Zion's operating utility—Exelon—previously assumed that a decades-long SAFSTOR period would be required for its decommissioning trust to grow and become fully funded. Thus, the growth of third-party firms could reduce the prevalence of SAFSTOR if plants are able to decommission at a cost that is less than previously anticipated.

The NRC approved a transfer of the license of the Vermont Yankee plant from Entergy to a third-party decommissioning firm, NorthStar Group Services in July 2018. Like Exelon, Entergy had originally planned to enter a decades-long SAFSTOR period to allow its decommissioning trust funds to grow to a level sufficient to decommission the plant, but NorthStar stated that it can begin decommissioning immediately and complete it by 2030 and possibly as early as the mid-2020s. As we understand the transaction, NorthStar has taken over ownership of the plant and corresponding decommissioning trust. It will use the trust funds to decommission the plant and retain any unspent funds as profit from the transaction. In other words, NorthStar believes it can fully decommission the Vermont Yankee plant for less than Entergy anticipated when it originally planned to manage the decommissioning, and it was willing to take the risk associating with achieving these savings. The NRC approved the license transfer in October of 2018 and the Vermont Public Utility Commission issued an order approving the sale in December.

Holtec International (Holtec) has also emerged as a significant firm in the decommissioning industry. In 2019 Holtec purchased both the Oyster Creek and Pilgrim Nuclear plants for decommissioning. Holtec also announced an agreement in April 2019 to acquire Entergy's Indian Point Nuclear power plant units for expedited decommissioning. Under that agreement, Entergy will sell Units 1, 2, and 3 to a Holtec subsidiary, transferring licenses, spent fuel, decommissioning liability, and nuclear decommissioning trusts for the units.

Finally, Duke Energy Florida has finalized a contract with Accelerated Decommissioning Partners to do the decommissioning work at a cost of approximately \$540 million, with Duke remaining the owner but ADP is now the operator of Crystal River. They now expect the plant to be decommissioned by 2027 with only the dry cask storage facility remaining thereafter.

2. *Escalation/Inflation Rate*

The second primary driver of the decommissioning estimate is an updated set of assumptions regarding escalation and inflation. Goldman Sachs Asset Management (GSAM), our investment advisor for the NDT, provided the forecast analysis for the escalation/inflation rates used in this filing's accrual calculations. A more comprehensive narrative of this analysis and accompanying graphs are included in Schedule B, which includes a discussion of the economic and inflation factors, including gross domestic product growth, labor productivity, and other considerations utilized in estimating long-term inflation rates.

The Company recommends a 3.78 percent escalation rate for the labor component of decommissioning and a 2.58 percent escalation rate for the non-labor components. The 1.2 percent difference in this escalation rate for non-labor reflects the fact that increases in labor productivity will not have an impact on escalation of non-labor costs. These two rates were factored into the calculation of the future costs of nuclear decommissioning. However, the Prairie Island Indian Community payments were not escalated as they remain constant each year until the fuel is removed from the site.

3. Forecast Earnings Rate

GSAM also provided the analysis for the forecasted earnings rate, which was reviewed internally for reasonableness. A more comprehensive narrative of this analysis and accompanying graphs are included in Schedule C, which includes a discussion of the analytical framework used by GSAM to arrive at the forward-looking expected returns. It also includes a discussion regarding our investment strategy, investment and economic assumptions, and the expected returns for the various classes of investments that are currently a part of the fund.

While there is inherent uncertainty in any forward-looking expected return and escalation/inflation forecasts, the longer it takes to complete the decommissioning, the more time the fund has to compound earnings on the amounts contributed. At the same time, however, a longer decommissioning period also subjects the fund to more risk that the estimated earnings will not be realized as expected.

Consistent with our past triennial filings, the Company recommends a stratification of the earnings rate between the operational period and the decommissioning period. We also recommend two earnings rates for each facility to better match the earnings rates with the individual cost estimates and to better replicate the separation in the Qualified Trusts within the NDT. Each unit has its own set of earnings rates due to the difference in the timing of cash flows and different decommissioning start dates. Table 3 below shows the expected after-tax returns that are representative of the analysis detailed in Schedule C.

Table 3 – Earnings Rates Forecast

| Nuclear Unit | <u>60-Year Scenario</u> | | | |
|-----------------------|-------------------------|--------|-------------------|--------|
| | <u>2017 Rates</u> | | <u>2020 Rates</u> | |
| | Operations | Decom. | Operations | Decom. |
| Monticello | 5.00% | 4.43% | 3.80% | 3.10% |
| Prairie Island Unit 1 | 4.99% | 4.15% | 4.01% | 2.80% |
| Prairie Island Unit 2 | 5.04% | 4.09% | 3.98% | 2.72% |

The decrease in the expected after-tax returns is largely the result of lower overall interest rates in the market impacting forward looking expected returns for multiple asset classes.

C. Trust Structure & Investment Strategy

The NDT investments are contained in three Qualified Trusts, which are a standard decommissioning fund that cannot be refunded to customers until all decommissioning activities are completed. The Company has established an individual Qualified Trust for each nuclear operating unit to hold the decommissioning funds required by the NRC.

Below we discuss our investment strategy for the NDT as well as our liquidity assumptions for the trust.

1. Investment Strategy

As discussed in previous triennial dockets, the Company's NDT Committee routinely evaluates both the NDT's performance and the overall investment strategy for the fund (including its asset allocation), and it revises both the strategy and allocation as necessary.

As part of this Triennial Nuclear Decommissioning Accrual filing, the Company undertook a comprehensive review of our investment allocations to evaluate portfolio changes that would be effective over the next triennial period. The process of determining the portfolio's asset mix is called asset allocation optimization. Different mixes of assets can produce hundreds, or even thousands, of alternative combinations of risk and returns. As a result, asset allocation techniques are used in practice to evaluate the various possible asset mixes and determine those combinations that are likely to deliver optimal performance in terms of risk and return.

We have used this process to perform a long-term optimization of the asset allocation for the NDT's investments. With any investment, there is always a trade-off between expected risk and the expected rate of return on that investment. Typically, strategies

with higher expected returns also come with higher expected risk and vice versa. The goal is to optimize the trade-off between risk and return over the long term. If, on one hand, too little risk is taken, increased contributions likely will be needed to make up for the lack of sufficient market returns. If, on the other hand, too much risk is taken, it also is possible that increased contributions will be needed in the event an unfavorable outcome is realized

Following the Company’s full analysis of multiple investment portfolios, we recommend the following investment mix shown in Table 4 below. We note that the development of this recommendation followed a process deemed prudent by the independent investment review required by the Commission’s February 27, 2017 Order in Docket No. E002/M-14-761. That review also concluded that the Company “has found an appropriate balance to achieving a reasonable risk adjusted return” and that its asset allocation is “properly diversified amongst a reasonable amount of non-correlated assets classes.”

Table 4 – Recommended Investment Mix

| Portfolio Line Item | 2017 Target | 2020 Target |
|--------------------------------|--------------------|--------------------|
| Total Equity | 60.0% | 58.0% |
| Private Equity | 10.0% | 10.0% |
| US All Cap Equity | 25.8% | 27.9% |
| Non-US Developed Equity | 14.1% | 12.6% |
| Emerging Markets Equity | 10.1% | 7.5% |
| Fixed Income | 30.0% | 30.0% |
| Investment Grade Fixed Income | 12.1% | 19.0% |
| High Yield Fixed Income | 10.0% | 5.0% |
| Emerging Market Debt | 7.9% | 6.0% |
| Private Real Estate | 10.0% | 12.0% |
| Cash | 0.0% | 0.0% |
| Overall fund benchmark: | 100.0% | 100.0% |

Consistent with prior triennial filings, we request that the Commission approve this asset allocation, which we believe results in an optimized trade-off between risk and return over the long term on a forward-looking basis. That said, the Company will continue to analyze the portfolio asset mix and make updates and changes as necessary. In other words, the portfolio mix identified in this filing is a snapshot of a point in time and could change between now and the next triennial filing.

A more detailed discussion of the recommended target asset mix for the decommissioning fund, along with an analysis of the forward-looking expected returns is included in Schedule C.

a. Liquidity Assumptions

Our analysis assumes that the funds are invested in bonds as a cash outlay is approached. For each expected annual outgoing cash flow, assets are converted to bonds ahead of time to give more certainty to the ability to make the payment. Not all funds are converted to bonds – only enough to cover each annual cash outflow. For example, if the conversion is at a five-year period, the first outflows expected in 2030 are converted to bonds in 2025; then in 2026, enough cash is converted to bonds to match the 2031 expected outflow.

D. Current Fund Balances

Annually, the Company reports the balances in the various funds in either this petition or a separate letter. The balances for both the Qualified Trust for the MN Jurisdiction are discussed below.

1. *Qualified Trust*

As of June 30, 2020, the Qualified Trust book value balance for all three operating units was a total of \$1,306 million for the MN Jurisdiction, with a total market value of \$1,765 million. The difference between the book value and the market value is the unrealized gains and losses. Table 5 below shows the book and market values by unit. A detailed presentation of each unit’s balances is presented in Schedule D.

Table 5 – Qualified Trust Balance as of June 30, 2020

| Unit | Book Value | Market Value |
|-----------------------|-----------------|-----------------|
| Monticello | \$594,749,330 | \$793,777,262 |
| Prairie Island Unit 1 | 335,862,951 | 458,345,888 |
| Prairie Island Unit 2 | 375,757,525 | 512,577,436 |
| Total | \$1,306,369,807 | \$1,764,700,585 |

The Qualified Trust balances are maintained by retail and wholesale jurisdictions. The retail jurisdictions are Minnesota, North Dakota, South Dakota, and Wisconsin. The wholesale jurisdictions are Minnesota and Wisconsin; since 2014, there have been no wholesale customers. The wholesale balance that was previously collected from wholesale customers is applied to the estimated dismantling cost on a jurisdictional

basis and reduces the accrual calculation for which the retail customers are responsible.

In Order Point 10 of the January 7, 2019 Order in Docket No. E002/M-17-828, the Commission required that “Xcel shall also report on whether the Company should redistribute to retail customers the wholesale customer contribution.” We believe that redistributing funds is not necessary, but if FERC approval to transfer the funds were sought and received, doing so would not be unreasonable. Whether we redistribute funds from the wholesale customers to retail customers, what is critical is to ensure that the amount of funds assigned to the two wholesale jurisdictions is factored into the Minnesota retail accrual calculation. The reason we believe that we have to factor a portion of the wholesale balance into the accrual calculation relates to the allocation of the cost estimate to each jurisdiction. One hundred percent of the cost estimate is allocated to the retail jurisdictions as these customers carry the burden of funding the remaining amount for decommissioning. If we did not include a portion of the wholesale balance in the accrual calculation, the accrual calculations for each retail jurisdiction will over recover the amount needed by the wholesale balance. Thus, we must account for the Minnesota jurisdictional amount of the Minnesota and Wisconsin wholesale balance when calculating the accrual.

The book value balance for the Minnesota and Wisconsin wholesale jurisdictions in total was \$49.7 million, and the market value was \$66.5 million at June 30, 2020. The proposed distribution of these balances using the rate case demand allocators, assigned 72.9219% of the total to the Minnesota Retail jurisdiction, or \$36.2 million additional book value balance and \$48.5 million in market value balance. The allocation of the wholesale jurisdiction balances is included in Schedule D. Including the Minnesota Retail portion of the wholesale jurisdiction balances to the June 30, 2020 balances, results in the adjusted balances used in this filing as follows in Table 6:

Table 6 – Adjusted Qualified Trust Balance as of June 30, 2020

| Unit | Book Value | Market Value |
|-----------------------|-----------------|-----------------|
| Monticello | \$610,109,002 | \$814,968,100 |
| Prairie Island Unit 1 | 346,629,286 | 471,960,960 |
| Prairie Island Unit 2 | 385,837,890 | 526,255,835 |
| Total | \$1,342,576,178 | \$1,813,184,895 |

2. *Beginning Fund Balance for Annuity Calculation*

The 2017 Filing was submitted using the fund's adjusted market values, per the Commission order, and the 2020 filing continues to use the adjusted market value as a basis for the accrual. Using the adjusted market value is consistent with forward looking market conditions and will provide the most justifiable and proper accrual estimate at this time. The adjusted funds currently have a \$470.6 million unrealized net gain. However, not all of this unrealized gain is available to fund decommissioning costs because taxes will have to be paid on the gains when they are realized. Therefore, the June 30, 2020 adjusted market value was dampened by \$131.0 million for the estimated tax that can be expected be paid when the unrealized gain is realized. The Company calculated the tax effect on the June 30, 2020 adjusted market value based on the unrealized gains and losses in the portfolio. This tax effect calculation is shown with each accrual calculation in Schedule E.

3. *Escrow Fund*

In the 2014 Filing, the Commission approved the discontinuance of the Escrow Fund and approved the transfer (pour-over) to the Qualified Trust. The Company completed this pour-over in 2016 and reported a zero balance in the Escrow Fund with the 2017 compliance filing to 2014 Filing.

VII. EFFECT OF CHANGE UPON THE COMPANY'S REVENUE

Subdivision 1 (b) of Minn. Stat. §216B.2445 requires the inclusion of an estimated customer impact for each of the assumed periods. For this petition we calculated the rate impact to each of the customer classes on a \$/kWh increase. This was done by allocating the estimated accruals for the various scenarios presented in Schedule F to the customer classes using the most recent Class Cost of Service Study.

The class allocation process used the same stratification methodology approved by the Commission in Docket No. E002/M-11-807 to return the DOE Settlement dollars to customers. This included an approximate 19.0 percent weight to capacity and an 81.0 percent weight to energy usage from Docket No E002/GR-19-564. The accrual was then divided by the energy each class forecasted to be used over a 12-month period ending December 31, 2020, also from Docket No. E002/GR-19-564, to determine a \$/kWh that would be required for that class to collect its portion of the accrual. Schedule F provides the result of this calculation for all accruals provided in Schedule E.

VIII. EOL NUCLEAR FUEL

At the time each nuclear unit is shut down, there will be nuclear fuel remaining in the reactor that has not been fully utilized. We refer to this unused fuel as end-of-life (EOL) nuclear fuel. The unused fuel cannot be transferred to another facility, and the amortization expense for said fuel would have to be taken at the end of operations at each unit. To avoid this spike in amortization at the end of the useful life of each unit, the Company estimates the expected cost of unused fuel at the end of operations and amortizes the expense over the remaining life of each unit. This is done using a sinking fund method.

The Company recommends a decrease to the annual internal accrual for EOL nuclear fuel for this triennial filing. The Company is proposing to change the 2022 accrual based on the new EOL nuclear fuel factors discussed in Schedule G. The Minnesota jurisdictional annual accrual for 2022 is requested to be \$714,366. This is a decrease of \$1,591,993 over the accrual based on the factors approved in the 2017 Filing.

This recommended decrease stems mainly from an update in the estimates of the cost of the final fuel at shutdown. The estimated amount to be recovered decreased approximately \$38 million from the estimate used in the 2017 Filing. The decrease was primarily the result of leveling of \$/MWh through optimization of the multi-cycle core fuel designs close to EOLL, primarily at Prairie Island Unit 2, and lower projected nuclear fuel commodity prices in the future. The 2022 accrual worksheet detailing the calculation is included in Schedule G.

IX. PREMATURE RISK INVESTIGATION

In previous Orders, the Commission has directed the Company to provide an investigation of premature risk in its Triennial Nuclear Decommissioning Accrual filings.¹⁷ Consistent with the Commission's prior orders, our investigation included the following aspects of the risks of premature decommissioning:

- The availability of commercial insurance.
- The availability of electric industry co-insurance.
- Any programs, which may be proposed, mandated, or administered by the NRC or any other United States Government agency.

¹⁷ *In the Matter of the Petition of Northern States Power Company d/b/a Xcel Energy for Approval of the 2012-2014 Triennial Nuclear Plant Decommissioning Accrual*, Docket No. E002/M-11-939, Order Approving Decommissioning Plan and Modifying Refund Plan, (Dec. 4, 2012).

- Specific detailed information pertaining to any steps the Company has taken to minimize any possible loss, which may occur as a result of premature decommissioning.
- The Company's ability to withstand possible economic and financial trauma, which may be associated with premature decommissioning.

Schedule H contains the regular response to that request. It addresses accident and non-accident related premature decommissioning of nuclear generating facilities. Presently, insurance is unavailable for non-accident related premature decommissioning such as those caused by regulatory directives. Therefore, the insurance analysis deals with accidents.

The Company's property insurance coverage of \$2.65 billion would largely offset the potential impact of an accident-related decommissioning. Although accident-related decommissioning expenses are significant, the length of time involved in a clean-up process, insurance payments, tax deductibility of expenses, and related rate relief would affect the yearly expense. Although accident related premature decommissioning would affect both the Company and its customers, it is anticipated that, with acceptable regulatory decisions, the financial integrity of the Company would be maintained.

X. ASSET RETIREMENT OBLIGATION

The implementation of the Statement of Financial Accounting Standards No. 143 (SFAS 143), *Accounting for Asset Retirement Obligations* (ARO) in January of 2003 brought some changes to the accrual accounting for decommissioning. Financial Accounting Standards Board (FASB) Interpretation No. 47 (FIN 47), *Accounting for Conditional Asset Retirement Obligations* was released in March 2005. These statements are both included within the FASB Accounting Standards Codification (ASC) 410 *Asset Retirement and Environmental Obligations*. This Interpretation of the conditionality of an ARO has resulted in some additional accounting analysis for many of the fixed assets at the Company. Nuclear decommissioning was never assumed to be conditional in nature, thus the ARO accounting for nuclear decommissioning established in 2003 is unaffected by this Interpretation. Nonetheless, a summary of the ARO accounting for nuclear decommissioning is included in Schedule I for reference. This section is provided in response to the Commission's Order Point 9. from the 2017 Filing.

CONCLUSION

Xcel Energy respectfully requests the Commission approve our Petition for Approval of the 2022-2024 Nuclear Decommissioning Accrual. As described in this filing, we specifically request Commission approval of:

- Approve our decommissioning study and assumptions as compliant with the Company's obligations under Minnesota statutes, Commission rules, and prior precedent;
- Continue allocation of DOE settlement funds to the NDT;
- Approve an accrual of \$31,368,901 effective in 2022 to meet the needs of the Company's 60-year spent fuel scenario, with no recasking of the fuel, for 2022 through 2024 while strategic decisions about the future of our nuclear units are decided in our 2019 IRP;
- Approve an annual accrual of \$0.7 million for EOL nuclear fuel for the calendar year 2022 through 2024; and
- Approve the proposed asset allocation for the NDT.

The next decommissioning filing would be for the calendar years 2025 through 2027 with the submittal due December 1, 2023.

Dated: December 1, 2020

Northern States Power Company

STATE OF MINNESOTA
BEFORE THE
MINNESOTA PUBLIC UTILITIES COMMISSION

| | |
|--------------------|--------------|
| Katie J. Sieben | Chair |
| Valerie Means | Commissioner |
| Matthew Schuerger | Commissioner |
| Joseph K. Sullivan | Commissioner |
| John A. Tuma | Commissioner |

IN THE MATTER OF THE PETITION OF
NORTHERN STATES POWER COMPANY
FOR APPROVAL OF THE 2022-2024
TRIENNIAL NUCLEAR DECOMMISSIONING
STUDY & ASSUMPTIONS

DOCKET NO. E002/M-20-____

SUMMARY

SUMMARY OF FILING

Please take notice that on December 1, 2020, Northern States Power Company, doing business as Xcel Energy, filed with the Minnesota Public Utilities Commission its Petition for approval of its Triennial Nuclear Decommissioning Study and Assumptions. In this Petition the Company analyzed several decommissioning scenarios and calculated a number of different accruals. The resulting accrual calculations range from an \$8.6 million reduction to an increase of \$207.5 million.

The full version of this filing can be found by searching the Department of Commerce's efilings website:

<https://www.edockets.state.mn.us/EFiling/edockets/searchDocuments.do?method=showDocketsSearch&showEocket=true&userType=public>.

A docket number has not yet been assigned, but the filing can be found by searching the Received Date: December 1, 2020, and On Behalf Of: Xcel Energy.

ENCLOSURE 3

**2020 DECOMMISSIONING COST ANALYSIS FOR THE MONTICELLO NUCLEAR
GENERATING PLANT**

266 pages follow

Document X01-1775-002, Rev. 0

DECOMMISSIONING COST ANALYSIS
for the
MONTICELLO NUCLEAR GENERATING PLANT



prepared for

Xcel Energy

prepared by

TLG Services, LLC
Bridgewater, Connecticut

October 2020

APPROVALS

| | | |
|--------------------------|--|---------------------------|
| Project Manager | <u><i>Francis W. Seymore</i></u> Francis W. Seymore | <u>10/21/2020</u> Date |
| Project Engineer | <u><i>Christopher R. Koriniskie</i></u> Christopher R. Koriniskie | <u>10/21/2020</u> Date |
| Technical Manager | <u><i>Roderick W. Knight</i></u> Roderick W. Knight | <u>10/21/2020</u> Date |

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| No. | Date | Item Revised | Reason for Revision |
|------------|-------------|---------------------|----------------------------|
| 0 | 10-21-2020 | | Original Issue |

EXECUTIVE SUMMARY

This report presents estimates of the cost to decommission the Monticello Nuclear Generating Plant (Monticello) for the identified decommissioning scenarios following a cessation of plant operations in 2030. The estimates are designed to provide Xcel Energy with the information to assess its current decommissioning liability, as it relates to Monticello.

The analysis relies upon site-specific, technical information from an evaluation prepared in 2017, ^[1] updated to reflect current assumptions pertaining to the disposition of the nuclear plant and relevant industry experience in undertaking such projects. The costs are based on several key assumptions in areas of regulation, component characterization, high-level radioactive waste management, low-level radioactive waste disposal, performance uncertainties (contingency) and site restoration requirements.

While the analysis is not a detailed engineering evaluation, it represents the estimates prepared in advance of the detailed engineering required to carry out the decommissioning of the nuclear unit. It may also not reflect the actual plan to decommission Monticello; the plan may differ from the assumptions made in this analysis based on facts that exist at the time of decommissioning.

The primary goal of the decommissioning is the removal and disposal of the contaminated systems and structures so that the plant's operating license can be terminated. The analysis recognizes that spent fuel will be stored at the site in the reactor building's storage pool and/or in an Independent Spent Fuel Storage Installation (ISFSI) until such time that it can be transferred to a Department of Energy (DOE) facility. Consequently, the estimates also include those costs to manage and subsequently decommission these storage facilities.

The current cost estimates assume that Monticello ceases operations in 2030. The cost estimates assume that the shutdown date of the nuclear unit is scheduled and pre-planned (i.e., there is no delay in transitioning the plant and workforce from operations or in obtaining regulatory relief from operating requirements, etc.). This estimate includes additional resources to support the engineering, planning, and licensing efforts for the station; this is done to support a decommissioning schedule similar to the prior estimate. The estimates include the continued operation of the reactor building as an interim wet fuel storage facility for approximately four years after operations cease. The spent fuel will remain in the ISFSI until the DOE is able to

¹ "Decommissioning Cost Analysis for the Monticello Nuclear Generating Plant," Document No. X01-1725-002, Rev. 0, TLG Services, Inc., October 2017

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Decommissioning Cost Analysis**

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complete the transfer of the fuel to a federal facility (e.g., a monitored retrievable storage facility).^[2] The estimates also include the dismantling of non-essential structures and limited restoration of the site.

The 2017 plant inventory, the basis for the decontamination and dismantling requirements and cost, and the decommissioning waste streams, was reviewed for this analysis. Over the three-year period between estimates the plant confirmed there were no substantive changes to the configuration of the plant or site facilities (that would significantly impact decommissioning).

The costs to decommission Monticello, for the scenarios evaluated, are tabulated at the end of this section. Costs are reported in 2020 dollars and include monies anticipated to be spent for radiological remediation and operating license termination, spent fuel management, and site restoration activities.

A complete discussion of the assumptions relied upon in this analysis is provided in Section 3, along with schedules of annual expenditures for each scenario. A sequence of significant project activities is provided in Section 4 with a timeline for each scenario. Detailed cost reports used to generate the summary tables contained within this document are provided in Appendices C through J.

Alternatives and Regulations

The ultimate objective of the decommissioning process is to reduce the inventory of contaminated and activated material so that the license can be terminated. The Nuclear Regulatory Commission (NRC or Commission) provided initial decommissioning requirements in its rule adopted on June 27, 1988.^[3] In this rule, the NRC set forth technical and financial criteria for decommissioning licensed nuclear power facilities. The regulations addressed planning needs, timing, funding methods, and environmental review requirements for decommissioning. The rule also defined three decommissioning alternatives as being acceptable to the NRC: DECON, SAFSTOR, and ENTOMB.

DECON is defined as "the alternative in which the equipment, structures, and portions of a facility and site containing radioactive contaminants are

² Projected expenditures for spent fuel management identified in the cost analysis do not consider any compensation for damages with regard to the delays incurred by Xcel Energy in the timely removal of spent fuel by the DOE.

³ U.S. Code of Federal Regulations, Title 10, Parts 30, 40, 50, 51, 70 and 72, "General Requirements for Decommissioning Nuclear Facilities," Nuclear Regulatory Commission, 53 Fed. Reg. 24018, June 27, 1988

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removed or decontaminated to a level that permits the property to be released for unrestricted use shortly after cessation of operations."^[4]

SAFSTOR is defined as "the alternative in which the nuclear facility is placed and maintained in a condition that allows the nuclear facility to be safely stored and subsequently decontaminated (deferred decontamination) to levels that permit release for unrestricted use."^[5] Decommissioning is to be completed within 60 years, although longer time periods will be considered when necessary to protect public health and safety.

ENTOMB is defined as "the alternative in which radioactive contaminants are encased in a structurally long-lived material, such as concrete; the entombed structure is appropriately maintained and continued surveillance is carried out until the radioactivity decays to a level permitting unrestricted release of the property."^[6] As with the SAFSTOR alternative, decommissioning is currently required to be completed within 60 years, although longer time periods will also be considered when necessary to protect public health and safety.

The 60-year restriction has limited the practicality for the ENTOMB alternative at commercial reactors that generate significant amounts of long-lived radioactive material. In 1997, the Commission directed its staff to re-evaluate this alternative and identify the technical requirements and regulatory actions that would be necessary for entombment to become a viable option. The resulting evaluation provided several recommendations, however, rulemaking has been deferred based upon several factors (e.g., no licensee has committed to pursuing the entombment option, the unresolved issues associated with the disposition of greater-than-Class C material (GTCC), and the NRC's current priorities) at least until after the additional research studies are complete. The Commission concurred with the staff's recommendation. In a draft regulatory basis document published in March 2017 in support of rulemaking that would amend NRC regulations concerning nuclear plant decommissioning, the NRC staff proposes removing any discussion of the ENTOMB option from existing guidance documents since the method is not deemed practically feasible.

⁴ Ibid., Page FR24022, Column 3

⁵ Ibid.

⁶ Ibid., Page FR24023, Column 2

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In 1996, the NRC published revisions to its general requirements for decommissioning nuclear power plants to clarify ambiguities and codify procedures and terminology as a means of enhancing efficiency and uniformity in the decommissioning process.^[7] The amendments allow for greater public participation and better define the transition process from operations to decommissioning. Regulatory Guide 1.184 Revision 1, issued in October 2013, further described the methods and procedures that are acceptable to the NRC staff for implementing the requirements of the 1996 revised rule that relate to the initial activities and the major phases of the decommissioning process. The costs and schedules presented in this analysis follow the general guidance and sequence in the amended regulations. The format and content of the estimates is also consistent with the recommendations of Regulatory Guide 1.202, issued February 2005.^[8]

In 2011, the NRC published amended regulations to improve decommissioning planning and thereby reduce the likelihood that any current operating facility will become a legacy site.^[9] The regulations require licensees to report additional details in their decommissioning cost estimate, including a decommissioning estimate for the ISFSI. This estimate is provided in Appendix K.

Decommissioning Scenarios

The following scenarios were evaluated and are intended to bound the liability associated with the removal of spent fuel from the site. The current operating license expires in 2030. The scenarios consist of four spent fuel management scenarios, each with a DECON and a SAFSTOR decommissioning alternative for eight total scenarios. The duration of the spent fuel scenarios has little impact to the decommissioning costs and timing of the power block systems and structures. The spent fuel in the plant's spent fuel storage pool is transferred to the ISFSI within the first four years. The equipment, structures, and portions of the plant containing radioactive contaminants are removed or decontaminated to a level that permits the facility to be released for unrestricted use. Remaining site structures are then demolished. Spent fuel storage operations continue at the ISFSI until the transfer of the fuel to the DOE is completed (as shown in the "Last Spent Fuel Assembly" column in the following table).

⁷ U.S. Code of Federal Regulations, Title 10, Parts 2, 50 and 51, "Decommissioning of Nuclear Power Reactors," Nuclear Regulatory Commission, 61 Fed. Reg. 39278, July 29, 1996

⁸ "Standard Format and Content of Decommissioning Cost Estimates for Nuclear Power Reactors," Regulatory Guide 1.202, Nuclear Regulatory Commission, February 2005

⁹ U.S. Code of Federal Regulations, Title 10, Parts 20, 30, 40, 50, 70, and 72, "Decommissioning Planning," Nuclear Regulatory Commission, Federal Register Volume 76, (p 35512 et seq.), June 17, 2011

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| Scenario | 1 st Spent Fuel Canister Replacement | 1 st Spent Fuel Assembly Removed from Monticello* | Last Spent Fuel Assembly Removed from Monticello | Scenario Identification |
|----------|---|--|--|-------------------------------------|
| 1 | n/a | 2052 | 2072 | DECON with 42 Year DFS ⁺ |
| 2 | n/a | 2078 | 2090 | DECON with 60 Year DFS |
| 3 | 2058 | 2118 | 2130 | DECON with 100 Year DFS |
| 4 | 2058 | 2218 | 2230 | DECON with 200 Year DFS |
| 5 | n/a | 2052 | 2072 | SAFSTOR with 42 Year DFS |
| 6 | n/a | 2078 | 2090 | SAFSTOR with 60 Year DFS |
| 7 | 2058 | 2118 | 2130 | SAFSTOR with 100 Year DFS |
| 8 | 2058 | 2218 | 2230 | SAFSTOR with 200 Year DFS |

* Spent fuel stored at Morris is removed prior to fuel stored at the Monticello site.

+ Dry Fuel Storage

For Scenarios 1 and 5, although they only provide a total fuel storage period of 42 years following shutdown, some of the Monticello casks have been in storage since 2008. Xcel Energy directed TLG Services to not include the cost of transferring the spent fuel in dry storage to new canisters for those casks that exceed 50 years. The assumption to not transfer spent fuel at 50-years total storage duration for these two scenarios was premised on the likelihood that the life of the canisters could be successfully extended for the additional years.

For Scenarios 2 and 6, although they provide a total fuel storage period of nominally 60 years following shutdown, Xcel Energy directed TLG Services to not include the cost of transferring the spent fuel in dry storage to new canisters at the 50-year mark.

In Scenarios 3, 4, 7 and 8, the Dry Shielded Canisters (DSCs) are assumed to be replaced after fifty years of use. Since the reactor building spent fuel storage pool and fuel handling facilities are removed by the year 2038, a dry fuel transfer facility is assumed to be constructed on site to perform the transfers from the old to the new DSCs. For Scenarios 3 and 7, two such transfer is needed over the time frame assumed. For Scenarios 4 and 8, the spent fuel will be transferred four times following initial placement in the ISFSI.

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Methodology

The methodology used to develop the estimates follows the basic approach originally presented in the cost estimating guidelines ^[10] developed by the Atomic Industrial Forum (now Nuclear Energy Institute). This reference describes a unit cost factor method for estimating decommissioning activity costs. The unit cost factors used in this analysis incorporate site-specific costs and the latest available information about worker productivity in decommissioning.

An activity duration critical path is used to determine the total decommissioning program schedule. This is required for calculating the carrying costs, which include program management, administration, field engineering, equipment rental, quality assurance, and security. This systematic approach for assembling decommissioning estimates ensures a high degree of confidence in the reliability of the resulting costs.

The estimates also reflect lessons learned from TLG's involvement in the Shippingport Station Decommissioning Project, completed in 1989, as well as the decommissioning of the Cintichem reactor, hot cells and associated facilities, completed in 1997. In addition, the planning and engineering for the Rancho Seco, Trojan, Yankee Rowe, Big Rock Point, Maine Yankee, Humboldt Bay-3, Oyster Creek, Connecticut Yankee, Crystal River, Vermont Yankee, Fort Calhoun, Pilgrim, and Indian Point nuclear units have provided additional insight into the process, the regulatory aspects, and the technical challenges of decommissioning commercial nuclear units.

Contingency

Consistent with cost estimating practice, contingencies are applied to the decontamination and dismantling costs developed as "specific provision for unforeseeable elements of cost within the defined project scope, particularly important where previous experience relating estimates and actual costs has shown that unforeseeable events which will increase costs are likely to occur."^[11] The cost elements in the estimates are based on ideal conditions; therefore, the types of unforeseeable events that are almost certain to occur in decommissioning, based on industry experience, are addressed through a percentage contingency applied on a line-item basis. This contingency factor is a nearly universal element in all large-scale construction and demolition projects. It should be noted that contingency, as used in this analysis, does not account for price escalation and inflation in the cost of

¹⁰ T.S. LaGuardia et al., "Guidelines for Producing Commercial Nuclear Power Plant Decommissioning Cost Estimates," AIF/NESP-036, May 1986

¹¹ Project and Cost Engineers' Handbook, Second Edition, American Association of Cost Engineers, Marcel Dekker, Inc., New York, New York, p. 239

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decommissioning over the remaining operating life of the station, or duration of the decommissioning program and dry fuel storage period.

Contingency funds are expected to be fully expended throughout the program. As such, inclusion of contingency is necessary to provide assurance that sufficient funding will be available to accomplish the intended tasks.

Low-Level Radioactive Waste Disposal

The contaminated and neutron-activated material generated in the decontamination and dismantling of a commercial nuclear reactor is classified as low-level (radioactive) waste, although not all of the material is suitable for “shallow-land” disposal. With the passage of the “Low-Level Radioactive Waste Policy Act” in 1980, ^[12] and its Amendments of 1985, ^[13] the states became ultimately responsible for the disposition of low-level radioactive waste generated within their own borders. It was expected that groups of states would combine together to jointly deal with their radioactive wastes; these organizations are referred to as waste disposal compacts.

With the exception of Texas, no new compact facilities have been successfully sited, licensed, and constructed. The Texas Compact disposal facility is now operational and waste is being accepted from generators within the Compact by the operator, Waste Control Specialists (WCS). The facility is also able to accept limited quantities of non-Compact waste.

Disposition of the various waste streams produced by the decommissioning process considered all options and services currently available to Xcel Energy. The majority of the low-level radioactive waste designated for direct disposal (Class A ^[14]) can be sent to EnergySolutions’ facility in Clive, Utah. Therefore, disposal costs for Class A waste were based upon current contract rates. This facility is not licensed to receive the higher activity portion of the decommissioning waste stream (Classes B and C resins and activated metal from the reactor vessel^[15]).

The Texas facility is licensed to receive the higher activity waste forms (Classes B and C). As such, for this analysis, disposal costs for the Class B and C waste were based upon the Xcel-provided information on the cost for such from WCS.

¹² “Low-Level Radioactive Waste Policy Act,” Public Law 96-573, 1980

¹³ “Low-Level Radioactive Waste Policy Amendments Act of 1985,” Public Law 99-240, 1986

¹⁴ Waste is classified in accordance with U.S. Code of Federal Regulations, Title 10, Part 61.55

¹⁵ U.S. Code of Federal Regulations, Title 10, Part 61, “Licensing Requirements for Land Disposal of Radioactive Waste”

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The dismantling of the components residing closest to the reactor core generates radioactive waste considered unsuitable for shallow-land disposal (i.e., low-level radioactive waste with concentrations of radionuclides that exceed the limits established by the NRC for Class C radioactive waste (GTCC)). The Low-Level Radioactive Waste Policy Amendments Act of 1985 assigned the federal government the responsibility for the disposal of this material. The Act also stated that the beneficiaries of the activities resulting in the generation of such radioactive waste bear all reasonable costs of disposing of such waste.

The DOE issued its final Environmental Impact Statement for the disposal of GTCC on January 2016.^[16] The study evaluated the potential environmental impacts associated with constructing and operating a new facility or using an existing facility, disposal methods, and locations. DOE is awaiting Congressional action on the report and its recommendations. At this time, the federal government has not identified a specific cost for disposing of GTCC or a schedule for acceptance.

For purposes of this analysis, the GTCC radioactive waste is assumed to be packaged and disposed of in a similar manner as high-level waste and at a cost equivalent to that envisioned for the spent fuel. The GTCC is packaged in the same canisters used for spent fuel and either stored on site or shipped directly to a DOE facility as it is generated (depending upon the timing of the decommissioning and whether the spent fuel has been removed from the site prior to the start of physical decommissioning).

A significant portion of the waste material generated during decommissioning may only be potentially contaminated by radioactive materials. This waste can be analyzed on site or shipped off site to licensed facilities for further analysis, for processing and/or for conditioning/recovery. Reduction in the volume of low-level radioactive waste requiring disposal in a licensed low-level radioactive waste disposal facility can be accomplished through a variety of methods, including analyses and surveys or decontamination to isolate the portion of waste that does not require disposal as radioactive waste, compaction, incineration or metal melt. The estimates reflect the savings from waste recovery/volume reduction.

High-Level Radioactive Waste Management

Congress passed the “Nuclear Waste Policy Act”^[17] (NWPA) in 1982, assigning the federal government’s long-standing responsibility for disposal of the spent nuclear fuel created by the commercial nuclear generating plants to the DOE. The DOE was to

¹⁶ “Final Environmental Impact Statement for the Disposal of Greater-Than-Class C (GTCC) Low-Level Radioactive Waste and GTCC-Like Waste (DOE/EIS-0375),” January 2016

¹⁷ “Nuclear Waste Policy Act of 1982 and Amendments,” DOE’s Office of Civilian Radioactive Management, 1982

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begin accepting spent fuel by January 31, 1998; however, to date no progress in the removal of spent fuel from commercial generating sites has been made.

Today, the country is at an impasse on high-level waste disposal, even with the License Application for a geologic repository submitted by the DOE to the NRC in 2008. The Obama administration cut the budget for the repository program while promising to “conduct a comprehensive review of policies for managing the back end of the nuclear fuel cycle ... and make recommendations for a new plan.”^[18] Towards this goal, the administration appointed a Blue Ribbon Commission on America’s Nuclear Future (Blue Ribbon Commission) to make recommendations for a new plan for nuclear waste disposal. The Blue Ribbon Commission’s charter includes a requirement that it consider “[o]ptions for safe storage of used nuclear fuel while final disposition pathways are selected and deployed.”^[19]

On January 26, 2012, the Blue Ribbon Commission issued its “Report to the Secretary of Energy” containing a number of recommendations on nuclear waste disposal. Two of the recommendations that may impact decommissioning planning are:

- “[T]he United States [should] establish a program that leads to the timely development of one or more consolidated storage facilities”^[20]
- “[T]he United States should undertake an integrated nuclear waste management program that leads to the timely development of one or more permanent deep geological facilities for the safe disposal of spent fuel and high-level nuclear waste.”^[21]

In January 2013, the DOE issued the “Strategy for the Management and Disposal of Used Nuclear Fuel and High-Level Radioactive Waste,” in response to the recommendations made by the Blue Ribbon Commission and as “a framework for moving toward a sustainable program to deploy an integrated system capable of transporting, storing, and disposing of used nuclear fuel...”^[22] This document states:

¹⁸ Blue Ribbon Commission on America’s Nuclear Future’s Charter, <http://cybercemetery.unt.edu/archive/brc/20120620215336/http://brc.gov/index.php?q=page/charter>

¹⁹ *Ibid.*

²⁰ “Blue Ribbon Commission on America’s Nuclear Future, Report to the Secretary of Energy,” p. 32, January 2012

²¹ *Ibid.*, p.27

²² “Strategy for the Management and Disposal of Used Nuclear Fuel and High-Level Radioactive Waste,” U.S. DOE, January 11, 2013

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“With the appropriate authorizations from Congress, the Obama Administration planned to implement a program over the next 10 years that would have:

- Sites, designs and licenses, constructs and begins operations of a pilot interim storage facility by 2021 with an initial focus on accepting used nuclear fuel from shut-down reactor sites;
- Advances toward the siting and licensing of a larger interim storage facility to be available by 2025 that will have sufficient capacity to provide flexibility in the waste management system and allows for acceptance of enough used nuclear fuel to reduce expected government liabilities; and
- Makes demonstrable progress on the siting and characterization of repository sites to facilitate the availability of a geologic repository by 2048.”^[23]

The NRC’s review of DOE’s license application to construct a geologic repository at Yucca Mountain was suspended in 2011 when the Obama Administration significantly reduced the budget for completing that work. However, the US Court of Appeals for the District of Columbia Circuit issued a writ of mandamus (in August 2013) ^[24] ordering NRC to comply with federal law and restart its review of DOE’s Yucca Mountain repository license application to the extent of previously appropriated funding for the review. That review is now complete with the publication of the five-volume safety evaluation report. A supplement to DOE’s environmental impact statement and an adjudicatory hearing on the contentions filed by interested parties must be completed before a licensing decision can be made. Although the DOE proposed it would start fuel acceptance in 2025, no progress has been made in the repository program since DOE’s 2013 strategy was issued except for the completion of the Yucca Mountain safety evaluation report.

Holtec International submitted a license application to the NRC on March 30, 2017 for a consolidated interim spent fuel storage facility in southeast New Mexico called HI-STORE CIS (Consolidated Interim Storage) under the provisions of 10 CFR Part 72. The application is currently under NRC review.

A centralized interim storage project was initiated by Waste Control Specialists (WCS) for a site in Andrews County, Texas, adjacent to WCS’s existing low-level radioactive waste and hazardous waste storage and disposal facilities. The NRC license application for this project was filed in April 2016. In April 2017, WCS

²³ *Ibid.*, p.2

²⁴ United States Court of Appeals for the District Of Columbia Circuit, In Re: Aiken County, et al, August 2013

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asked the NRC to suspend the review of this application. Subsequently, WCS and Orano USA (formerly Areva Nuclear Materials) formed a joint venture to license the facility. In response to letters to the NRC in June and July 2018 from the joint venture, Interim Storage Partners, the NRC restarted its review of the application

On May 10, 2018, the U.S. House of Representatives passed H.R. 3053, the “Nuclear Waste Policy Amendments Act of 2018.” Proposed to amend the Nuclear Waste Policy Act of 1982, the legislation, if approved by the Senate and signed by the President, would provide the DOE the authority to site, construct, and operate one or more Monitored Retrieval Storage (MRS) facilities while a permanent repository is licensed and constructed and/or to enter into an MRS agreement with a non-Federal entity for temporary storage.

Completion of the decommissioning process is dependent upon the DOE’s ability to remove spent fuel from the site in a timely manner. DOE’s repository program had originally assumed that spent fuel allocations would be accepted for disposal from the nation’s commercial nuclear plants, with limited exceptions, in the order (the “queue”) in which it was discharged from the reactor.^[25] However, the Blue Ribbon Commission, in its final report, noted that: “[A]ccepting spent fuel according to the OFF [Oldest Fuel First] priority ranking instead of giving priority to shutdown reactor sites could greatly reduce the cost savings that could be achieved through consolidated storage if priority could be given to accepting spent fuel from shutdown reactor sites before accepting fuel from still-operating plants. The magnitude of the cost savings that could be achieved by giving priority to shutdown sites appears to be large enough (i.e., in the billions of dollars) to warrant DOE exercising its right under the Standard Contract to move this fuel first.”

The state of Minnesota directed the Public Utilities Commission, “when considering approval of a plan for the accrual of funds for the decommissioning of nuclear facilities” ...to “include an evaluation of the costs, if any, arising from storage of used nuclear fuel that may be incurred by the state of Minnesota, and any tribal community, county, city, or township where used nuclear fuel is located following the cessation of operations at a nuclear plant.”^[26]

²⁵ U.S. Code of Federal Regulations, Title 10, Part 961.11, Article IV – Responsibilities of the Parties, B. DOE Responsibilities, 5.(a) ... DOE shall issue an annual acceptance priority ranking for receipt of SNF and/or HLW at the DOE repository. This priority ranking shall be based on the age of SNF and/or HLW as calculated from the date of discharge of such materials from the civilian nuclear power reactor. The oldest fuel or waste will have the highest priority for acceptance ...”

²⁶ Minnesota Statute 216B.2445, “Nuclear Power Plant Decommissioning and Storage of Used Nuclear Fuel”

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The state of Minnesota statute also prescribed the parameters to be used in evaluating spent fuel management costs. “To assist the commission in making the determination ... the filing shall provide cost estimates, including ratepayer impacts, assuming used nuclear fuel will be stored in the state for 60 years, 100 years, and 200 years following the cessation of operation of the nuclear plant.”^[27]

Xcel Energy’s current spent fuel management plan for the Monticello spent fuel is based in general upon:

- 1) Fuel transferred from the pool to the ISFSI within 4 years of shutdown;
- 2) Exchange of Prairie Island and Monticello spent fuel acceptance rights to best manage the overall cost of spent fuel storage for both plants;
- 3) Fuel will be shipped in the existing NUHOMS DSCs (Scenarios 1, 2, 5, and 6); the NUHOMS are periodically replaced in Scenarios 3, 4, 7 and 8. Canisters that are unloaded in the spent fuel transfer operation will be surveyed for neutron activation.
- 4) As an allowance, some of these canisters and NUHOMS modules from the first off-load operation are assumed to be mildly neutron activated and therefore must be disposed of as radioactive waste.
- 5) For the 100 and 200 year dry fuel storage scenarios (Scenarios 3, 4, 7 and 8) the canisters and casks will be replaced on a 50 year schedule using a dry transfer facility.^[28]
- 6) Currently Monticello is storing spent fuel assemblies at the Morris Operation facility of GE Hitachi Nuclear Energy in Morris, Illinois. These assemblies will be shipped for final disposal to DOE prior to the removal of fuel from the Monticello site.

The NRC requires that licensees establish a program to manage and provide funding for the caretaking of all irradiated fuel at the reactor site until title of the fuel is transferred to the Secretary of Energy, pursuant to 10 CFR Part 50.54(bb).^[29] This requirement is prepared for through inclusion of certain cost elements in the

²⁷ Ibid.

²⁸ “Order Approving Nuclear Decommissioning Study, Assumptions, and Annual Accrual, and Setting Filing Requirements”, Page 8, Items 12e and 12g, Minnesota Public Utilities Commission Docket E-002/M-14-761 October 4, 2015

²⁹ U.S. Code of Federal Regulations, Title 10, Part 50, “Domestic Licensing of Production and Utilization Facilities,” Subpart 54 (bb), “Conditions of Licenses”

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decommissioning estimates, for example, associated with the isolation and continued operation of the spent fuel pool and the ISFSI.

The spent fuel pool is expected to contain freshly discharged assemblies (from the most recent refueling cycles) as well as the final reactor core at shutdown. The assemblies are packaged into dry shielded canisters (DSCs) over the first four years after shutdown for transfer to the ISFSI for interim storage. It is assumed that this period provides the necessary cooling for the final core to meet the transport and/or storage requirements for decay heat.

An ISFSI, operated under a Part 50 General License (in accordance with 10 CFR 72, Subpart K ^[30]), has been constructed to support continued plant operations. The facility is assumed to be expanded to support decommissioning. This will allow decommissioning activities to proceed within the reactor building.

DOE has breached its obligations to remove fuel from reactor sites, and has also failed to provide the plant owners with information about how it will ultimately perform. DOE officials have stated that DOE does not have an obligation to accept already-canistered fuel without an amendment to DOE's contracts with plant licensees to remove the fuel (the "Standard Contract"), but DOE has not explained what any such amendment would involve. Consequently, Xcel Energy has no information or expectations on how DOE will remove fuel from the site in the future. In the absence of information about how DOE will perform, and for purposes of this analysis only, it is assumed that DOE will accept already-canistered fuel. If this assumption is incorrect, it is assumed that DOE will have liability for costs incurred to transfer the fuel to DOE-supplied containers.

Xcel Energy's position is that the DOE has a contractual obligation to accept Monticello's fuel earlier than the projections set out above consistent with its contract commitments. No assumption made in this study should be interpreted to be inconsistent with this claim. However, including the cost of storing spent fuel in this study is appropriate to ensure the availability of sufficient decommissioning funds at the end of the station's life if the DOE has not met its obligation. The cost for the interim storage of spent fuel has been calculated and is separately presented as "Spent Fuel Management" expenditures in this report.

Site Restoration

The efficient removal of the contaminated materials at the site may result in damage to many of the site structures. Blasting, coring, drilling, and the other

³⁰ U.S. Code of Federal Regulations, Title 10, Part 72, Subpart K, "General License for Storage of Spent Fuel at Power Reactor Sites"

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decontamination activities can substantially damage power block structures, potentially weakening the footings and structural supports. It is unreasonable to anticipate that these structures would be repaired and preserved after the radiological contamination is removed. The cost to dismantle site structures with a work force already mobilized is more efficient and less costly than if the process were deferred. Experience at shutdown generating stations has shown that plant facilities quickly degrade without maintenance, adding additional expense and creating potential hazards to the public and the demolition work force.

This estimate assumes that some site features will remain following the decommissioning project. These include the existing electrical switchyard, which is assumed to remain functional in support of the regional electrical distribution system. The existing shoreline will also be left intact.

Consequently, non-essential site structures addressed by this analysis are completely removed (including foundations) as required by Minnesota statute ^[31]. The site is then graded and stabilized. The cost for the site restoration of non-essential and/or non-contaminated structures has been calculated and is separately presented as "Site Restoration" expenditures in this report.

Summary

The costs to decommission the Monticello station were evaluated for several spent fuel removal scenarios, using both the DECON and SAFSTOR decommissioning alternatives. Regardless of the timing of the decommissioning activities, the estimates to decommission Monticello assume the removal of all contaminated and activated plant components and structural materials such that Xcel Energy may then have unrestricted use of the site with no further requirements for an operating license. In most of the scenarios, spent fuel remains on site following the decommissioning and site restoration of the power block structures. The spent fuel remains in storage at the site until such time that the transfer to a DOE facility can be completed. Once the transfer is complete, the storage facilities are also decommissioned.

The alternatives evaluated in this analysis are described in Section 2. The assumptions are presented in Section 3, along with schedules of annual expenditures. The major cost contributors are identified in Section 6, with detailed activity costs, waste volumes, and associated manpower requirements delineated in Appendices C through J. The major cost components are also identified in the cost summary provided at the end of this section.

³¹ Minnesota Administrative Rule part 7035.0400 "General Requirements"

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The estimates presented in this document reflect the total cost to decontaminate the nuclear unit, manage the spent fuel until the DOE is able to complete the transfer to a federal facility, dismantle the plant and restore the site for alternative use.

The cost elements in the estimates for the four DECON and SAFSTOR alternatives are assigned to one of three subcategories: NRC License Termination (radiological remediation), Spent Fuel Management, and Site Restoration. The subcategory “NRC License Termination” is used to accumulate costs that are consistent with “decommissioning” as defined by the NRC in its financial assurance regulations (i.e., 10 CFR §50.75). The cost reported for this subcategory is generally sufficient to terminate the unit’s operating license, recognizing that there may be some additional cost impact from spent fuel management. The License Termination cost subcategory also includes costs to decommission the ISFSI (as required by 10 CFR §72.30). Section 3.4.1 provides the basis for the ISFSI decommissioning cost.

The “Spent Fuel Management” subcategory contains costs associated with the containerization and transfer of spent fuel from the wet storage pool to the ISFSI, as well as the transfer of the spent fuel in storage at the ISFSI to the DOE. Costs are included for the operation of the storage pool and the management of the ISFSI until such time that the transfer is complete. It does not include any spent fuel management expenses incurred prior to the cessation of plant operations, nor does it include any costs related to the final disposal of the spent fuel.

“Site Restoration” is used to capture costs associated with the dismantling and demolition of buildings and facilities demonstrated to be free from contamination. This includes structures never exposed to radioactive materials, as well as those facilities that have been decontaminated to appropriate levels. Structures are completely removed (including foundations) and backfilled to conform to local surface elevation.

It should be noted that the costs assigned to these subcategories are allocations. Delegation of cost elements is for the purposes of comparison (e.g., with NRC financial guidelines) or to permit specific financial treatment (e.g., Asset Retirement Obligation determinations). In reality, there can be considerable interaction between the activities in the three subcategories. For example, Xcel Energy may decide to remove non-contaminated structures early in the project to improve access to highly contaminated facilities or plant components. In these instances, the non-contaminated removal costs could be reassigned from Site Restoration to an NRC License Termination support activity. However, in general, the allocations represent a reasonable accounting of those costs that can be expected to be incurred for the specific subcomponents of the total estimated program cost, if executed as described.

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As noted within this document, the estimates were developed and costs are presented in 2020 dollars. As such, the estimates do not reflect the escalation of costs (due to inflationary and market forces) over the remaining operating life of the plant or during the decommissioning period.

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Page xxiv of xxxi****SCENARIO 1: DECON WITH 42 YEARS DFS
DECOMMISSIONING COST ELEMENTS**
(thousands of 2020 dollars)

| Cost Element | Total |
|--|------------------|
| Decontamination | 24,330 |
| Removal | 124,923 |
| Packaging | 26,543 |
| Transportation | 14,145 |
| Waste Disposal | 114,148 |
| Off-site Waste Processing | 57,444 |
| Program Management [1] | 291,793 |
| Site Security | 300,359 |
| Spent Fuel Pool Isolation | 14,576 |
| Spent Fuel Storage (Direct Costs) [2] | 243,342 |
| Insurance and Regulatory Fees | 39,755 |
| Energy | 10,030 |
| Characterization and Licensing Surveys | 23,012 |
| Property Taxes | 55,377 |
| Miscellaneous Equipment | 7,411 |
| Railroad Track Maintenance | 6,915 |
| Retention and Severance | 41,002 |
| Security Modifications | 10,000 |
| Total [3] | 1,405,104 |

| Cost Element | Total |
|-------------------------|------------------|
| NRC License Termination | 776,139 |
| Spent Fuel Management | 555,579 |
| Site Restoration | 73,386 |
| Total [3] | 1,405,104 |

[1] Includes engineering costs

[2] Includes costs for the dry storage system components, spent fuel loading and transfer, spent fuel pool O&M and EP fees, but excludes program management costs (staffing), security and other related costs

[3] Columns may not add due to rounding

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DECOMMISSIONING COST ELEMENTS**
(thousands of 2020 dollars)

| Cost Element | Total |
|--|------------------|
| Decontamination | 24,330 |
| Removal | 124,923 |
| Packaging | 26,543 |
| Transportation | 14,145 |
| Waste Disposal | 114,148 |
| Off-site Waste Processing | 57,444 |
| Program Management ^[1] | 317,534 |
| Site Security | 389,439 |
| Spent Fuel Pool Isolation | 14,576 |
| Spent Fuel Storage (Direct Costs) ^[2] | 301,663 |
| Insurance and Regulatory Fees | 53,689 |
| Energy | 10,030 |
| Characterization and Licensing Surveys | 23,012 |
| Property Taxes | 73,368 |
| Miscellaneous Equipment | 7,411 |
| Railroad Track Maintenance | 9,505 |
| Retention and Severance | 41,002 |
| Security Modifications | 10,000 |
| Total ^[3] | 1,612,762 |

| Cost Element | Total |
|-----------------------------|------------------|
| NRC License Termination | 776,139 |
| Spent Fuel Management | 763,237 |
| Site Restoration | 73,386 |
| Total ^[3] | 1,612,762 |

^[1] Includes engineering costs^[2] Includes costs for the dry storage system components, spent fuel loading and transfer, spent fuel pool O&M and EP fees, but excludes program management costs (staffing), security and other related costs^[3] Columns may not add due to rounding

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DECOMMISSIONING COST ELEMENTS**
(thousands of 2020 dollars)

| Cost Element | Total |
|--|------------------|
| Decontamination | 24,330 |
| Removal | 125,011 |
| Packaging | 26,543 |
| Transportation | 14,145 |
| Waste Disposal | 114,148 |
| Off-site Waste Processing | 57,444 |
| Program Management ^[1] | 502,435 |
| Site Security | 587,397 |
| Spent Fuel Pool Isolation | 14,576 |
| Spent Fuel Storage (Direct Costs) ^[2] | 875,124 |
| Insurance and Regulatory Fees | 84,655 |
| Energy | 10,030 |
| Characterization and Licensing Surveys | 23,012 |
| Property Taxes | 113,348 |
| Miscellaneous Equipment | 7,411 |
| Railroad Track Maintenance | 15,260 |
| Retention and Severance | 41,002 |
| Security Modifications | 10,000 |
| Total ^[3] | 2,645,871 |

| Cost Element | Total |
|-----------------------------|------------------|
| NRC License Termination | 776,228 |
| Spent Fuel Management | 1,795,906 |
| Site Restoration | 73,737 |
| Total ^[3] | 2,645,871 |

^[1] Includes engineering costs

^[2] Includes costs for the dry storage system components, spent fuel loading and transfer, spent fuel pool O&M and EP fees, but excludes program management costs (staffing), security and other related costs

^[3] Columns may not add due to rounding

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DECOMMISSIONING COST ELEMENTS**
(thousands of 2020 dollars)

| Cost Element | Total |
|--|------------------|
| Decontamination | 24,330 |
| Removal | 125,011 |
| Packaging | 26,543 |
| Transportation | 14,145 |
| Waste Disposal | 114,148 |
| Off-site Waste Processing | 57,444 |
| Program Management ^[1] | 782,364 |
| Site Security | 1,082,311 |
| Spent Fuel Pool Isolation | 14,576 |
| Spent Fuel Storage (Direct Costs) ^[2] | 1,961,162 |
| Insurance and Regulatory Fees | 162,073 |
| Energy | 10,030 |
| Characterization and Licensing Surveys | 23,012 |
| Property Taxes | 213,298 |
| Miscellaneous Equipment | 7,411 |
| Railroad Track Maintenance | 29,650 |
| Retention and Severance | 41,002 |
| Security Modifications | 10,000 |
| Total ^[3] | 4,698,509 |

| Cost Element | Total |
|-----------------------------|------------------|
| NRC License Termination | 776,228 |
| Spent Fuel Management | 3,848,543 |
| Site Restoration | 73,737 |
| Total ^[3] | 4,698,509 |

^[1] Includes engineering costs

^[2] Includes costs for the dry storage system components, spent fuel loading and transfer, spent fuel pool O&M and EP fees, but excludes program management costs (staffing), security and other related costs

^[3] Columns may not add due to rounding

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DECOMMISSIONING COST ELEMENTS**
(thousands of 2020 dollars)

| Cost Element | Total |
|--|------------------|
| Decontamination | 30,303 |
| Removal | 130,385 |
| Packaging | 17,375 |
| Transportation | 10,222 |
| Waste Disposal | 82,277 |
| Off-site Waste Processing | 67,679 |
| Program Management ^[1] | 415,951 |
| Site Security | 379,377 |
| Spent Fuel Pool Isolation | 14,576 |
| Spent Fuel Storage (Direct Costs) ^[2] | 233,722 |
| Insurance and Regulatory Fees | 61,212 |
| Energy | 23,983 |
| Characterization and Licensing Surveys | 24,381 |
| Property Taxes | 227,954 |
| Miscellaneous Equipment | 21,371 |
| Railroad Track Maintenance | 9,258 |
| Retention and Severance | 41,002 |
| Security Modifications | 10,000 |
| Total ^[3] | 1,801,028 |

| Cost Element | Total |
|-----------------------------|------------------|
| NRC License Termination | 1,258,686 |
| Spent Fuel Management | 479,749 |
| Site Restoration | 62,593 |
| Total ^[3] | 1,801,028 |

^[1] Includes engineering costs

^[2] Includes costs for the dry storage system components, spent fuel loading and transfer, spent fuel pool O&M and EP fees, but excludes program management costs (staffing), security and other related costs

^[3] Columns may not add due to rounding

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DECOMMISSIONING COST ELEMENTS**
(thousands of 2020 dollars)

| Cost Element | Total |
|--|------------------|
| Decontamination | 30,303 |
| Removal | 130,503 |
| Packaging | 17,378 |
| Transportation | 10,223 |
| Waste Disposal | 82,289 |
| Off-site Waste Processing | 67,679 |
| Program Management ^[1] | 433,069 |
| Site Security | 431,859 |
| Spent Fuel Pool Isolation | 14,576 |
| Spent Fuel Storage (Direct Costs) ^[2] | 289,013 |
| Insurance and Regulatory Fees | 66,507 |
| Energy | 23,983 |
| Characterization and Licensing Surveys | 24,381 |
| Property Taxes | 238,521 |
| Miscellaneous Equipment | 21,371 |
| Railroad Track Maintenance | 9,258 |
| Retention and Severance | 41,002 |
| Security Modifications | 10,000 |
| Total ^[3] | 1,941,915 |

| Cost Element | Total |
|-----------------------------|------------------|
| NRC License Termination | 1,250,097 |
| Spent Fuel Management | 629,040 |
| Site Restoration | 62,778 |
| Total ^[3] | 1,941,915 |

^[1] Includes engineering costs

^[2] Includes costs for the dry storage system components, spent fuel loading and transfer, spent fuel pool O&M and EP fees, but excludes program management costs (staffing), security and other related costs

^[3] Columns may not add due to rounding

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DECOMMISSIONING COST ELEMENTS**
(thousands of 2020 dollars)

| Cost Element | Total |
|--|------------------|
| Decontamination | 29,939 |
| Removal | 130,623 |
| Packaging | 22,597 |
| Transportation | 10,222 |
| Waste Disposal | 82,285 |
| Off-site Waste Processing | 67,679 |
| Program Management ^[1] | 544,148 |
| Site Security | 611,726 |
| Spent Fuel Pool Isolation | 14,576 |
| Spent Fuel Storage (Direct Costs) ^[2] | 863,002 |
| Insurance and Regulatory Fees | 97,864 |
| Energy | 24,005 |
| Characterization and Licensing Surveys | 24,381 |
| Property Taxes | 278,126 |
| Miscellaneous Equipment | 21,371 |
| Railroad Track Maintenance | 14,886 |
| Retention and Severance | 41,002 |
| Security Modifications | 10,000 |
| Total ^[3] | 2,888,431 |

| Cost Element | Total |
|-----------------------------|------------------|
| NRC License Termination | 1,248,652 |
| Spent Fuel Management | 1,580,426 |
| Site Restoration | 59,354 |
| Total ^[3] | 2,888,431 |

^[1] Includes engineering costs

^[2] Includes costs for the dry storage system components, spent fuel loading and transfer, spent fuel pool O&M and EP fees, but excludes program management costs (staffing), security and other related costs

^[3] Columns may not add due to rounding

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DECOMMISSIONING COST ELEMENTS**
(thousands of 2020 dollars)

| Cost Element | Total |
|--|------------------|
| Decontamination | 29,939 |
| Removal | 130,623 |
| Packaging | 22,597 |
| Transportation | 10,222 |
| Waste Disposal | 82,285 |
| Off-site Waste Processing | 67,679 |
| Program Management ^[1] | 824,077 |
| Site Security | 1,061,840 |
| Spent Fuel Pool Isolation | 14,576 |
| Spent Fuel Storage (Direct Costs) ^[2] | 1,949,073 |
| Insurance and Regulatory Fees | 175,282 |
| Energy | 24,005 |
| Characterization and Licensing Surveys | 24,381 |
| Property Taxes | 378,076 |
| Miscellaneous Equipment | 21,371 |
| Railroad Track Maintenance | 29,275 |
| Retention and Severance | 41,002 |
| Security Modifications | 10,000 |
| Total ^[3] | 4,896,303 |

| Cost Element | Total |
|-----------------------------|------------------|
| NRC License Termination | 1,248,733 |
| Spent Fuel Management | 3,588,216 |
| Site Restoration | 59,354 |
| Total ^[3] | 4,896,303 |

^[1] Includes engineering costs

^[2] Includes costs for the dry storage system components, spent fuel loading and transfer, spent fuel pool O&M and EP fees, but excludes program management costs (staffing), security and other related costs

^[3] Columns may not add due to rounding

1. INTRODUCTION

This report presents estimates of the cost to decommission the Monticello Nuclear Generating Plant (Monticello) and the operation and eventual decommissioning of the on-site Independent Spent Fuel Storage Installation (ISFSI) for the selected decommissioning scenarios following the scheduled cessation of plant operations. The estimates are designed to provide Xcel Energy with the information to assess its current decommissioning liability, as it relates to Monticello.

The analysis relies upon site-specific, technical information from an earlier evaluation prepared in 2017, ^[1]* updated to reflect current assumptions pertaining to the disposition of the nuclear plant and relevant industry experience in undertaking such projects. The costs are based on several key assumptions in areas of regulation, component characterization, high-level radioactive waste management, low-level radioactive waste disposal, performance uncertainties (contingency) and site restoration requirements.

The analysis is not a detailed engineering evaluation, but an estimate prepared in advance of the detailed engineering required to carry out the decommissioning of the nuclear unit. It may also not reflect the actual plan to decommission Monticello; the plan may differ from the assumptions made in this analysis based on facts that exist at the time of decommissioning.

The 2017 plant inventory was reviewed for this analysis. It serves as the basis for the decontamination and dismantling requirements, cost, and the decommissioning waste streams. The review confirmed that there were no substantive changes to the configuration of the plant or site facilities that would impact decommissioning over the last three years.

1.1 OBJECTIVES OF STUDY

The objectives of this study are to prepare comprehensive estimates of the cost to decommission Monticello, to provide a sequence or schedule for the associated activities, and to develop waste stream projections from the decontamination and dismantling activities.

The operating license was originally issued for the plant on September 8th, 1970, and was valid for a period of 40 years. In early 2005, Nuclear Management Company (as agent for Xcel Energy), submitted an application for

* Annotated references for citations in Sections 1-6 are provided in Section 7

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a renewed license (i.e., 20 year extension). The application was approved by the NRC in November 2006. Therefore, for the purposes of this study, the final shutdown date (license expiration) for Monticello is September 8th, 2030, assuming a 60-year operating life (the current operating license's expiration date).

1.2 SITE DESCRIPTION

Monticello is located on the Mississippi River within the city limits of Monticello, in Wright County, Minnesota. The plant is located approximately 30 miles northwest of the Minneapolis-St. Paul area.

The Nuclear Steam Supply System (NSSS) consists of a single cycle, forced circulation, low power density boiling water reactor. The reactor recirculation system is comprised of the reactor vessel; the two loop reactor recirculation system with its pumps, pipes, and valves; the main steam piping up to the main steam isolation valves; and the reactor auxiliary systems piping. The system is housed within a "containment system," consisting of a steel light bulb-shaped drywell, a steel doughnut-shaped pressure suppression chamber, and interconnecting vent pipes. This system provides the first containment barrier surrounding the reactor vessel and reactor primary system. The reactor building provides secondary containment and is designed as a controlled leakage structure.

The saturated steam leaving the reactor vessel flows through the four main steam lines to the main turbine located in the turbine building. After passing through the main turbine, low-pressure steam is condensed, the non-condensable gases are removed, and the condensate is demineralized before being returned to the reactor vessel through the reactor feedwater system heaters. The turbine-generator system converts the thermodynamic energy of the steam into electrical energy. The unit's turbine-generator consists of one single-flow, high-pressure, and two double-flow, low-pressure turbines driving a direct-coupled generator at 1800 rpm. Heat rejected in the main condenser is removed by the circulating water system.

The circulating water system has been designed for open cycle once-through cooling towers, closed cycle with cooling towers, or for variations of these modes, i.e., partial recirculation. The system for open cycle operation consists of an intake structure with two half-capacity circulating water pumps, piping river water through the condenser to a discharge structure where the water enters a 1000-foot long canal that returns the water to the river downstream from the intake. Two induced-draft cooling towers are used during the open

and closed cycle operations. Cooled effluent returns by gravity to the intake structure from the cooling tower basins.

1.3 REGULATORY GUIDANCE

The Nuclear Regulatory Commission (NRC or Commission) provided initial decommissioning requirements in its rule "General Requirements for Decommissioning Nuclear Facilities," issued in June 1988.^[2] This rule set forth financial criteria for decommissioning licensed nuclear power facilities. The regulation addressed decommissioning planning needs, timing, funding methods, and environmental review requirements. The intent of the rule was to ensure that decommissioning would be accomplished in a safe and timely manner and that adequate funds would be available for this purpose. Subsequent to the rule, the NRC issued Regulatory Guide 1.159, "Assuring the Availability of Funds for Decommissioning Nuclear Reactors,^[3]" which provided additional guidance to the licensees of nuclear facilities on the financial methods acceptable to the NRC staff for complying with the requirements of the rule. The regulatory guide addressed the funding requirements and provided guidance on the content and form of the financial assurance mechanisms indicated in the rule.

The rule defined three decommissioning alternatives as being acceptable to the NRC: DECON, SAFSTOR, and ENTOMB. The DECON alternative assumes that any contaminated or activated portion of the plant's systems, structures, and facilities are removed or decontaminated to levels that permit the site to be released for unrestricted use shortly after the cessation of plant operations while the SAFSTOR and ENTOMB alternatives defer the process.

The rule also placed limits on the time allowed to complete the decommissioning process. For the SAFSTOR alternative, the process is restricted in overall duration to 60 years, unless it can be shown that a longer duration is necessary to protect public health and safety. The guidelines for ENTOMB are similar, providing the NRC with both sufficient leverage and flexibility to ensure that these deferred options are only used in situations where it is reasonable and consistent with the definition of decommissioning. At the conclusion of a 50 to 60-year dormancy period (or longer for ENTOMB if the NRC approves such a case), the site would still require significant remediation to meet the unrestricted release limits for license termination.

The ENTOMB alternative has not been viewed as a viable option for power reactors due to the significant time required to isolate the long-lived radionuclides for decay to permissible levels. However, with rulemaking permitting the controlled release of a site,^[4] the NRC did re-evaluate the

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alternative. The resulting feasibility study, based upon an assessment by Pacific Northwest National Laboratory, concluded that the method did have conditional merit for some, if not most reactors. The staff also found that additional rulemaking would be needed before this option could be treated as a generic alternative.

The NRC had considered rulemaking to alter the 60-year time for completing decommissioning and to clarify the use of engineered barriers for reactor entombments.^[5] However, the NRC's staff has recommended that rulemaking be deferred, based upon several factors, e.g., no licensee has committed to pursuing the entombment option, the unresolved issues associated with the disposition of greater-than-Class C material (GTCC), and the NRC's current priorities, at least until after the additional research studies are complete. The Commission concurred with the staff's recommendation. In a draft regulatory basis document published in March 2017 in support of rulemaking that would amend NRC regulations concerning nuclear plant decommissioning, the NRC staff proposes removing any discussion of the ENTOMB option from existing guidance documents since the method is not deemed practically feasible.

In 1996, the NRC published revisions to the general requirements for decommissioning nuclear power plants.^[6] When the regulations were originally adopted in 1988, it was assumed that the majority of licensees would decommission at the end of the facility's operating licensed life. Since that time, several licensees permanently and prematurely ceased operations. Exemptions from certain operating requirements were required once the reactor was defueled to facilitate the decommissioning. Each case was handled individually, without clearly defined generic requirements. The NRC amended the decommissioning regulations in 1996 to clarify ambiguities and codify procedures and terminology as a means of enhancing efficiency and uniformity in the decommissioning process. The new amendments allow for greater public participation and better define the transition process from operations to decommissioning.

Under the revised regulations, licensees will submit written certification to the NRC within 30 days after permanent shutdown. Certification will also be required once the fuel is permanently removed from the reactor vessels. Submittal of these notices will entitle the licensee to a fee reduction and eliminate the obligation to follow certain requirements needed only during operation of the reactor. Prior to or within two years following permanent cessation of operations, the licensee is required to submit a Post-Shutdown Decommissioning Activities Report (PSDAR) to the NRC, and a copy to the affected State(s) (10 CFR 50.82(a)(4)(i)). The PSDAR describes the planned decommissioning activities, the associated sequence and schedule, and an

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estimate of expected costs. Prior to completing decommissioning, the licensee is required to submit applications to the NRC to terminate the license, which will include a License Termination Plan (LTP).

In 2011, the NRC published amended regulations to improve decommissioning planning and thereby reduce the likelihood that any current operating facility will become a legacy site.^[7] The regulations require licensees to report additional details in their decommissioning cost estimate including a decommissioning estimate for the ISFSI. This estimate is provided in Appendix K.

1.3.1 High-Level Radioactive Waste Management

Congress passed the “Nuclear Waste Policy Act” ^[8] (NWPA) in 1982, assigning the federal government’s long-standing responsibility for disposal of the spent nuclear fuel created by the commercial nuclear generating plants to the DOE. The DOE was to begin accepting spent fuel by January 31, 1998; however, to date no progress in the removal of spent fuel from commercial generating sites has been made.

Today, the country is at an impasse on high-level waste disposal, even with the License Application for a geologic repository submitted by the DOE to the NRC in 2008. The Obama administration cut the budget for the repository program while promising to “conduct a comprehensive review of policies for managing the back end of the nuclear fuel cycle ... and make recommendations for a new plan.” Towards this goal, the administration appointed a Blue Ribbon Commission on America’s Nuclear Future (Blue Ribbon Commission) to make recommendations for a new plan for nuclear waste disposal. The Blue Ribbon Commission’s charter includes a requirement that it consider “[o]ptions for safe storage of used nuclear fuel while final disposition pathways are selected and deployed.”^[9]

On January 26, 2012, the Blue Ribbon Commission issued its “Report to the Secretary of Energy” containing a number of recommendations on nuclear waste disposal. Two of the recommendations that may impact decommissioning planning are:

- “[T]he United States [should] establish a program that leads to the timely development of one or more consolidated storage facilities”^[10]
- “[T]he United States should undertake an integrated nuclear waste management program that leads to the timely

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development of one or more permanent deep geological facilities for the safe disposal of spent fuel and high-level nuclear waste.”

In January 2013, the DOE issued the “Strategy for the Management and Disposal of Used Nuclear Fuel and High-Level Radioactive Waste,” in response to the recommendations made by the Blue Ribbon Commission and as “a framework for moving toward a sustainable program to deploy an integrated system capable of transporting, storing, and disposing of used nuclear fuel...”^[11] This document states:

“With the appropriate authorizations from Congress, the Obama Administration planned to implement a program over the next 10 years that would have:

- Sites, designs and licenses, constructs and begins operations of a pilot interim storage facility by 2021 with an initial focus on accepting used nuclear fuel from shut-down reactor sites;
- Advances toward the siting and licensing of a larger interim storage facility to be available by 2025 that will have sufficient capacity to provide flexibility in the waste management system and allows for acceptance of enough used nuclear fuel to reduce expected government liabilities; and
- Makes demonstrable progress on the siting and characterization of repository sites to facilitate the availability of a geologic repository by 2048.”

The NRC’s review of DOE’s license application to construct a geologic repository at Yucca Mountain was suspended in 2011 when the Obama Administration significantly reduced the budget for completing that work. However, the US Court of Appeals for the District of Columbia Circuit issued a writ of mandamus (in August 2013)^[12] ordering NRC to comply with federal law and restart its review of DOE’s Yucca Mountain repository license application to the extent of previously appropriated funding for the review. That review is now complete with the publication of the five-volume safety evaluation report. A supplement to DOE’s environmental impact statement and an adjudicatory hearing on the contentions filed by interested parties must be completed before a licensing decision can be made. Although the DOE proposed it would start fuel acceptance in 2025, no progress has been made in the repository program since DOE’s 2013 strategy was issued except for the completion of the Yucca Mountain safety evaluation report.

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Holtec International submitted a license application to the NRC on March 30, 2017 for a consolidated interim spent fuel storage facility in southeast New Mexico called HI-STORE CIS (Consolidated Interim Storage) under the provisions of 10 CFR Part 72. The application is currently under NRC review.

A centralized interim storage project was initiated by Waste Control Specialists (WCS) for a site in Andrews County, Texas, adjacent to WCS's existing low-level radioactive waste and hazardous waste storage and disposal facilities. The NRC license application for this project was filed in April 2016. In April 2017, WCS asked the NRC to suspend the review of this application. Subsequently, WCS and Orano USA (formerly Areva Nuclear Materials) formed a joint venture to license the facility. In response to letters to the NRC in June and July 2018 from the joint venture, Interim Storage Partners, the NRC restarted its review of the application.

On May 10, 2018, the U.S. House of Representatives passed H.R. 3053, the "Nuclear Waste Policy Amendments Act of 2018." Proposed to amend the Nuclear Waste Policy Act of 1982, the legislation, if approved by the Senate and signed by the President, would provide the DOE the authority to site, construct, and operate one or more Monitored Retrieval Storage (MRS) facilities while a permanent repository is licensed and constructed and/or to enter into an MRS agreement with a non-Federal entity for temporary storage.

Completion of the decommissioning process is dependent upon the DOE's ability to remove spent fuel from the site in a timely manner. DOE's repository program had originally assumed that spent fuel allocations would be accepted for disposal from the nation's commercial nuclear plants, with limited exceptions, in the order (the "queue") in which it was discharged from the reactor.^[13] However, the Blue Ribbon Commission, in its final report, noted that: "[A]ccepting spent fuel according to the OFF [Oldest Fuel First] priority ranking instead of giving priority to shutdown reactor sites could greatly reduce the cost savings that could be achieved through consolidated storage if priority could be given to accepting spent fuel from shutdown reactor sites before accepting fuel from still-operating plants. The magnitude of the cost savings that could be achieved by giving priority to shutdown sites appears to be large enough (i.e., in the billions of dollars) to warrant DOE exercising its right under the Standard Contract to move this fuel first."

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The state of Minnesota directed the Public Utilities Commission, “when considering approval of a plan for the accrual of funds for the decommissioning of nuclear facilities” ...to “include an evaluation of the costs, if any, arising from storage of used nuclear fuel that may be incurred by the state of Minnesota, and any tribal community, county, city, or township where used nuclear fuel is located following the cessation of operations at a nuclear plant.”^[14]

The state of Minnesota statute also prescribed the parameters to be used in evaluating spent fuel management costs. “To assist the commission in making the determination ... the filing shall provide cost estimates, including ratepayer impacts, assuming used nuclear fuel will be stored in the state for 60 years, 100 years, and 200 years following the cessation of operation of the nuclear plant.”

Xcel Energy’s current spent fuel management plan for the Monticello spent fuel is based in general upon:

- 1) Fuel transferred from the pool to the ISFSI within 4 years of shutdown;
- 2) Exchange of Prairie Island and Monticello spent fuel acceptance rights to best manage the overall cost of spent fuel storage for both plants;
- 3) Fuel will be shipped in the existing NUHOMS DSCs (Scenarios 1, 2, 5, and 6); the NUHOMS are periodically replaced in Scenarios 3, 4, 7 and 8. Canisters that are unloaded in the spent fuel transfer operation will be surveyed for neutron activation.
- 4) As an allowance, some of these canisters and NUHOMS modules from the first off-load operation are assumed to be mildly neutron activated and therefore must be disposed of as radioactive waste.
- 5) For the 100 and 200 year dry fuel storage scenarios (Scenarios 3, 4, 7 and 8) the canisters and casks will be replaced on a 50 year schedule using a dry transfer facility. ^[15]
- 6) Currently Monticello is storing spent fuel assemblies at the Morris Operation facility of GE Hitachi Nuclear Energy in Morris, Illinois. These assemblies will be shipped for final disposal to DOE prior to the removal of fuel from the Monticello site.

The NRC requires that licensees establish a program to manage and provide funding for the caretaking of all irradiated fuel at the reactor site until title of the fuel is transferred to the Secretary of Energy,

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pursuant to 10 CFR Part 50.54(bb).^[16] This requirement is prepared for through inclusion of certain cost elements in the decommissioning estimates, for example, associated with the isolation and continued operation of the spent fuel pool and the ISFSI.

The spent fuel pool is expected to contain freshly discharged assemblies (from the most recent refueling cycles) as well as the final reactor core at shutdown. In the DECON and SAFSTOR scenarios, the assemblies are packaged into dry shielded canisters (DSCs) over the first four years after shutdown for transfer to the ISFSI for interim storage. It is assumed that this period provides the necessary cooling for the final core to meet the transport and/or storage requirements for decay heat.

An ISFSI, operated under a Part 50 General License (in accordance with 10 CFR 72, Subpart K^[17]), has been constructed to support continued plant operations. The facility is assumed to be expanded to support decommissioning. This will allow decommissioning activities to proceed within the reactor building.

DOE has breached its obligations to remove fuel from reactor sites, and has also failed to provide the plant owners with information about how it will ultimately perform. DOE officials have stated that DOE does not have an obligation to accept already-canistered fuel without an amendment to DOE's contracts with plant licensees to remove the fuel (the "Standard Contract"), but DOE has not explained what any such amendment would involve. Consequently, Xcel Energy has no information or expectations on how DOE will remove fuel from the site in the future. In the absence of information about how DOE will perform, and for purposes of this analysis only, it is assumed that DOE will accept already-canistered fuel. If this assumption is incorrect, it is assumed that DOE will have liability for costs incurred to transfer the fuel to DOE-supplied containers.

Xcel Energy's position is that the DOE has a contractual obligation to accept Monticello's fuel earlier than the projections set out above, consistent with its contract commitments. No assumption made in this study should be interpreted to be inconsistent with this claim. However, including the cost of storing spent fuel in this study is appropriate to ensure the availability of sufficient decommissioning funds at the end of the station's life if the DOE has not met its obligation. The cost for the interim storage of spent fuel has been calculated and is separately presented as "Spent Fuel Management" expenditures in this report.

1.3.2 Low-Level Radioactive Waste Disposal

The contaminated and activated material generated in the decontamination and dismantling of a commercial nuclear reactor is classified as low-level (radioactive) waste, although not all of the material is suitable for “shallow-land” disposal. With the passage of the “Low-Level Radioactive Waste Policy Act” in 1980, ^[18] and its Amendments of 1985, ^[19] the states became ultimately responsible for the disposition of low-level radioactive waste generated within their own borders. It was expected that groups of states would combine together to jointly deal with their radioactive wastes; these organizations are referred to as waste disposal compacts.

With the exception of Texas, no new compact facilities have been successfully sited, licensed, and constructed. The Texas Compact disposal facility is now operational and waste is being accepted from generators within the Compact by the operator, Waste Control Specialists (WCS). The facility is also able to accept limited quantities of non-Compact waste.

Disposition of the various waste streams produced by the decommissioning process considered all options and services currently available to Xcel Energy. The majority of the low-level radioactive waste designated for direct disposal (Class A ^[20]) can be sent to EnergySolutions’ facility in Clive, Utah. Therefore, disposal costs for Class A waste were based upon current contract rates. This facility is not licensed to receive the higher activity portion (Classes B and C) of the decommissioning waste stream.

The Texas facility is licensed to receive the higher activity waste forms (Classes B and C). As such, for this analysis, disposal costs for the Class B and C waste were based upon the preliminary and indicative information on the cost for such from WCS.

The dismantling of the components residing closest to the reactor core generates radioactive waste considered unsuitable for shallow-land disposal (i.e., low-level radioactive waste with concentrations of radionuclides that exceed the limits established by the NRC for Class C radioactive waste (GTCC)). The Low-Level Radioactive Waste Policy Amendments Act of 1985 assigned the federal government the responsibility for the disposal of this material. The Act also stated that the beneficiaries of the activities resulting in the generation of such radioactive waste bear all reasonable costs of disposing of such waste.

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The DOE issued its final Environmental Impact Statement for the disposal of GTCC on January 2016.^[21] The study evaluated the potential environmental impacts associated with constructing and operating a new facility or using an existing facility, disposal methods, and locations. DOE is awaiting Congressional action on the report and its recommendations. At this time, the federal government has not identified a specific cost for disposing of GTCC or a schedule for acceptance.

For purposes of this analysis, the GTCC radioactive waste is assumed to be packaged and disposed of in a similar manner as high-level waste and at a cost equivalent to that envisioned for the spent fuel. The GTCC is packaged in the same canisters used for spent fuel and either stored on site or shipped directly to a DOE facility as it is generated (depending upon the timing of the decommissioning and whether the spent fuel has been removed from the site prior to the start of decommissioning).

A significant portion of the metallic waste material generated during decommissioning may only be potentially contaminated by radioactive materials. This waste can be surveyed on site or shipped off site to licensed facilities for further analysis, for processing and/or for conditioning/recovery. Reduction in the volume of low-level radioactive waste requiring disposal in a licensed low-level radioactive waste disposal facility can be accomplished through a variety of methods, including analyses and surveys or decontamination to isolate the portion of waste that does not require disposal as radioactive waste, compaction, incineration or metal melt. The estimates reflect the savings from waste recovery/volume reduction.

1.3.3 Radiological Criteria for License Termination

In 1997, the NRC published Subpart E, “Radiological Criteria for License Termination,”^[22] amending 10 CFR §20. This subpart provides radiological criteria for releasing a facility for unrestricted use. The regulation states that the site can be released for unrestricted use if radioactivity levels are such that the average member of a critical group would not receive a Total Effective Dose Equivalent (TEDE) in excess of 25 millirem per year, and provided that residual radioactivity has been reduced to levels that are As Low As Reasonably Achievable (ALARA). The decommissioning estimates assume that the Monticello site will be remediated to a residual level consistent with the NRC-prescribed level.

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It should be noted that the NRC and the Environmental Protection Agency (EPA) differ on the amount of residual radioactivity considered acceptable in site remediation. The EPA has two limits that apply to radioactive materials. An EPA limit of 15 millirem per year is derived from criteria established by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund).^[23] An additional and separate limit of 4 millirem per year, as defined in 40 CFR §141.66, is applied to drinking water.^[24]

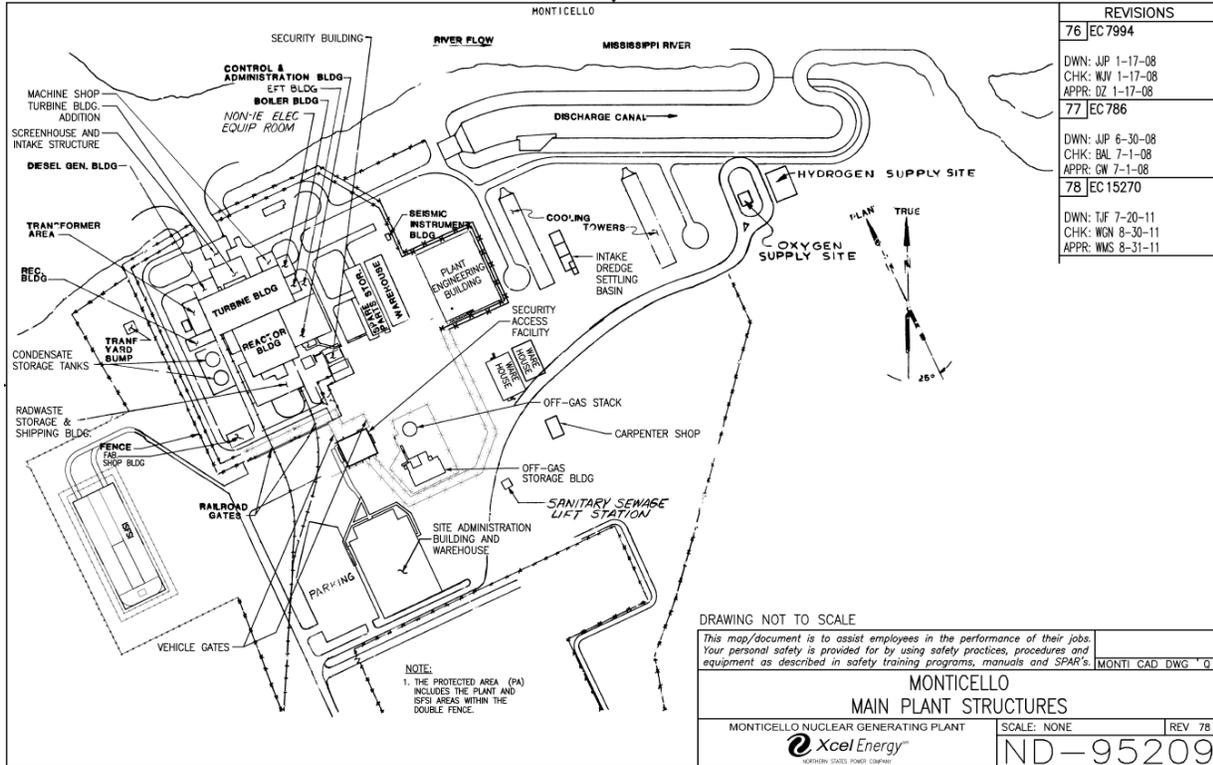
On October 9, 2002, the NRC signed an agreement with the EPA on the radiological decommissioning and decontamination of NRC-licensed sites. The Memorandum of Understanding (MOU)^[25] provides that EPA will defer exercise of authority under CERCLA for the majority of facilities decommissioned under NRC authority. The MOU also includes provisions for NRC and EPA consultation for certain sites when, at the time of license termination, (1) groundwater contamination exceeds EPA-permitted levels; (2) NRC contemplates restricted release of the site; and/or (3) residual radioactive soil concentrations exceed levels defined in the MOU.

The MOU does not impose any new requirements on NRC licensees and should reduce the involvement of the EPA with NRC licensees who are decommissioning. Most sites are expected to meet the NRC criteria for unrestricted use, and the NRC believes that only a few sites will have groundwater or soil contamination in excess of the levels specified in the MOU that trigger consultation with the EPA. However, if there are other hazardous materials on the site, the EPA may be involved in the cleanup. As such, the possibility of dual regulation remains for certain licensees. The present study does not include any costs for this occurrence.

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**FIGURE 1.1
 MONTICELLO NUCLEAR GENERATING PLANT
 GENERAL PLAN**



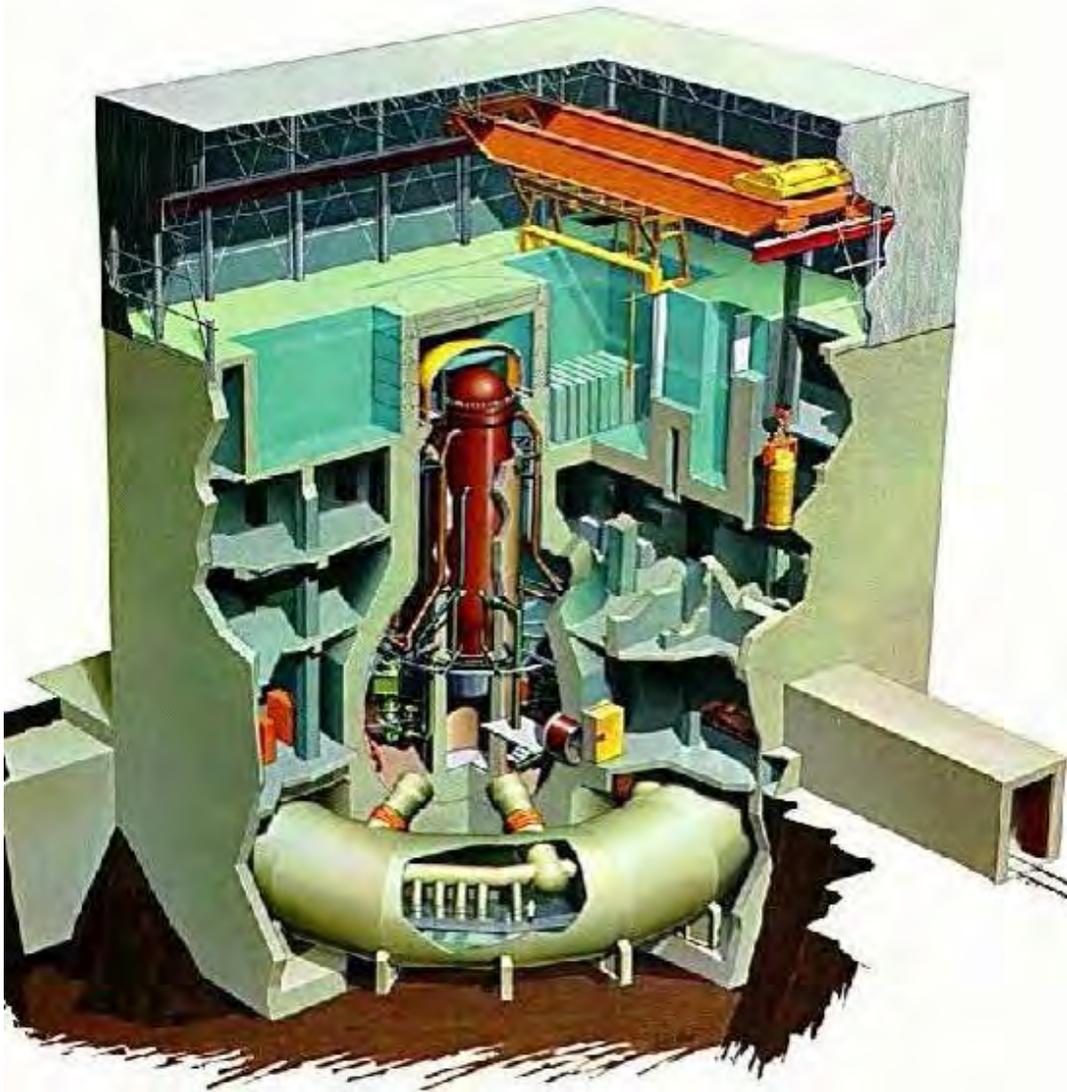
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**FIGURE 1.2
MONTICELLO NUCLEAR GENERATING PLANT
AERIAL VIEW**



**FIGURE 1.3
MONTICELLO NUCLEAR GENERATING PLANT
REACTOR BUILDING SECTION**



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Section 2, Page 1 of 15****2. DECOMMISSIONING ALTERNATIVES**

Detailed cost estimates were developed to decommission Monticello based upon the approved decommissioning alternatives: DECON and SAFSTOR. Although the alternatives differ with respect to technique, process, cost, and schedule, they attain the same result: the ultimate release of the site for unrestricted use.

The following scenarios were evaluated and are intended to bound the liability associated with the removal of spent fuel from the site. The current operating license expires in 2030. The scenarios consist of four spent fuel management scenarios, each with a DECON and a SAFSTOR decommissioning scenario for eight total scenarios. The duration of the spent fuel scenarios has little impact to the decommissioning costs and timing of the power block systems and structures. The spent fuel in the plant's spent fuel storage pool is transferred to the ISFSI within the first four years. The equipment, structures, and portions of the plant containing radioactive contaminants are removed or decontaminated to a level that permits the facility to be released for unrestricted use. Non-essential structures are then demolished. Spent fuel storage operations continue at the ISFSI until the transfer of the fuel to the DOE is completed (as shown in the "Last Spent Fuel Assembly" column in the following table).

| Scenario | 1 st Spent Fuel Canister Replacement | 1 st Spent Fuel Assembly Removed from Monticello | Last Spent Fuel Assembly Removed from Monticello | Scenario Identification |
|----------|---|---|--|-------------------------------------|
| 1 | n/a | 2052 | 2072 | DECON with 42 Year DFS ⁺ |
| 2 | n/a | 2078 | 2090 | DECON with 60 Year DFS |
| 3 | 2058 | 2118 | 2130 | DECON with 100 Year DFS |
| 4 | 2058 | 2218 | 2230 | DECON with 200 Year DFS |
| 5 | n/a | 2052 | 2072 | SAFSTOR with 42 Year DFS |
| 6 | n/a | 2078 | 2090 | SAFSTOR with 60 Year DFS |
| 7 | 2058 | 2118 | 2130 | SAFSTOR with 100 Year DFS |
| 8 | 2058 | 2218 | 2230 | SAFSTOR with 200 Year DFS |

* Spent fuel stored at Morris is removed after fuel stored at the Monticello site.

⁺ Dry Fuel Storage

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For Scenarios 1 and 5, although they only provide a total fuel storage period of 42 years following shutdown, some of the Monticello casks have been in storage since 2008. Xcel Energy directed TLG Services to not include the cost of transferring the spent fuel in dry storage to new canisters for those casks that exceed 50 years. The assumption to not transfer spent fuel at 50-years total storage duration for these two scenarios was premised on the likelihood that the life of the canisters could be successfully extended for the additional years.

For Scenarios 2 and 6, although they provide a total fuel storage period of nominally 60 years following shutdown, Xcel Energy directed TLG Services to not include the cost of transferring the spent fuel in dry storage to new canisters at the 50-year mark.

In Scenarios 3, 4, 7 and 8, the Dry Shielded Canisters (DSCs) are assumed to be replaced after fifty years of use. Since the Reactor Building spent fuel storage pool and fuel handling facilities are removed by the year 2038, a dry fuel transfer facility is assumed to be constructed on site to perform the transfers from the old to the new DSCs. For Scenarios 3 and 7, two such transfer is needed over the time frame assumed. For Scenarios 4 and 8, the spent fuel will be transferred four times following initial placement in the ISFSI.

The following sections describe the basic activities associated with each alternative. Although detailed procedures for each activity identified are not provided, and the actual sequence of work may vary, the activity descriptions provide a basis not only for estimating but also for the expected scope of work (i.e., engineering and planning at the time of decommissioning).

The conceptual approach that the NRC has described in its regulations divides decommissioning into three phases. The initial phase commences with the effective date of permanent cessation of operations and involves the transition of both plant and licensee from reactor operations (i.e., power production) to facilitate deactivation and closure. During the first phase, notification is to be provided to the NRC certifying the permanent cessation of operations and the removal of fuel from the reactor vessel. The licensee would then be prohibited from reactor operation.

The second phase encompasses activities during the storage period or during major decommissioning activities, or a combination of the two. The third phase pertains to the activities involved in license termination. The decommissioning estimates developed for Monticello are also divided into phases or periods; however, demarcation of the phases is based upon major milestones within the project or significant changes in the projected expenditures.

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2.1 DECON

The DECON alternative, as defined by the NRC, is "the alternative in which the equipment, structures, and portions of a facility and site containing radioactive contaminants are removed or decontaminated to a level that permits the property to be released for unrestricted use shortly after cessation of operations." This study does not address the cost to dispose of the spent fuel residing at the site; such costs are funded through a surcharge on electrical generation. However, the study does estimate the costs incurred with the interim on-site storage of the fuel pending shipment by the DOE to an off-site disposal facility. Those costs are separately presented as "Spent Fuel Management" expenditures in this report.

2.1.1 Period 1 - Preparations

In anticipation of the cessation of plant operations, detailed preparations are undertaken to provide a smooth transition from plant operations to site decommissioning. Through implementation of a staffing transition plan, the organization required to manage the intended decommissioning activities is assembled from available plant staff and outside resources. Preparations include the planning for permanent defueling of the reactor, revision of technical specifications applicable to the operating conditions and requirements, a characterization of the facility and major components, and the development of the PSDAR.

Engineering and Planning

The PSDAR, required prior to, or within two years of permanent cessation of operations, provides a description of the licensee's planned decommissioning activities, a timetable, a site-specific decommissioning cost estimate, and the associated financial requirements of the intended decommissioning program. Upon receipt of the PSDAR, the NRC will make the document available to the public for comment in a local meeting to be held in the vicinity of the reactor site. Ninety days following submittal and NRC receipt of the PSDAR, the licensee may begin to perform major decommissioning activities under a modified 10 CFR §50.59 procedure, (10 CFR §50.59 establishes the conditions under which licensees may make changes to the facility or procedures and conduct test or experiments, i.e., without prior NRC approval). Major activities are defined as any activity that results in permanent removal of major radioactive components, permanently modifies the structure of the containment, or results in dismantling components (for shipment)

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containing GTCC, as defined by 10 CFR §61. Major components are further defined as comprising the reactor vessel and internals, large bore reactor recirculation system piping, and other large components that are radioactive. The NRC includes the following additional criteria for use of the §50.59 process in decommissioning. The proposed activity must not:

- foreclose release of the site for possible unrestricted use,
- significantly increase decommissioning costs,
- cause any significant environmental impact not previously reviewed, or
- result in there no longer being reasonable assurance that adequate funds will be available for decommissioning

Existing operational technical specifications are reviewed and modified to reflect plant conditions and the safety concerns associated with permanent cessation of operations. The environmental impact associated with the planned decommissioning activities is also considered. Typically, a licensee will not be allowed to proceed if the consequences of a particular decommissioning activity are greater than that bounded by previously evaluated environmental assessments or impact statements. In this instance, the licensee would have to submit a license amendment for the specific activity and update the environmental report.

The decommissioning program outlined in the PSDAR will be designed to accomplish the required tasks within the ALARA guidelines (as defined in 10 CFR §20) for protection of personnel from exposure to radiation hazards. It will also address the continued protection of the health and safety of the public and the environment during the dismantling activity. Consequently, with the development of the PSDAR, activity specifications, cost-benefit and safety analyses, and work packages and procedures, would be assembled to support the proposed decontamination and dismantling activities.

Site Preparations

Following final plant shutdown, and in preparation for actual decommissioning activities, the following activities are initiated:

- Characterization of the site and surrounding environs. This includes radiation surveys of work areas, major components (including the

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reactor vessel and its internals), internal piping, and primary shield cores.

- An ISFSI has been constructed to support continued plant operation and will need to be expanded following the cessation of operations to offload the spent fuel pool in support of the decommissioning program.
- Isolation of the spent fuel storage pool and fuel handling systems, such that decommissioning operations can commence on the balance of the plant. Decommissioning operations are scheduled around the fuel handling area to optimize the overall project schedule. It is assumed that the fuel pool remains operational for the transfer of fuel for approximately four years following the cessation of operations.
- Specification of transport and disposal requirements for activated materials and/or hazardous materials, including shielding and waste stabilization.
- Development of procedures for occupational exposure control, control and release of liquid and gaseous effluent, processing of radwaste (including dry-active waste, resins, filter media, metallic and non-metallic components generated in decommissioning), site security and emergency programs, and industrial safety.
- Perform chemical decontamination of the NSSS to reduce radiation levels in support of removal operations.

2.1.2 Period 2 - Decommissioning Operations

This period includes the physical decommissioning activities associated with the removal and disposal of contaminated and activated components and structures, including the successful amendment of the 10 CFR §50 operating license (releasing the site, exclusive of the ISFSI). Significant decommissioning activities in this phase include:

- Construction of temporary facilities and/or modification of existing facilities to support dismantling activities. This may include a centralized processing area to facilitate equipment removal and component preparations for off-site disposal.
- Reconfiguration and modification of site structures and facilities as needed to support decommissioning operations. This may include the upgrading of roads (on- and off-site) to facilitate hauling and transport. Modifications may be required to the containment

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structure to facilitate access of large/heavy equipment. Modifications may also be required to the refueling area of the reactor building to support the segmentation of the reactor vessel internals and component extraction.

- Transfer of the spent fuel from the spent fuel storage pool to the ISFSI pad for interim storage.
- Design and fabrication of temporary and permanent shielding to support removal and transportation activities, construction of contamination control envelopes, and the procurement of specialty tooling.
- Procurement (lease or purchase) of shipping canisters, cask liners, and industrial packages.
- Decontamination of components and piping systems as required to control (minimize) worker exposure.
- Removal of piping and components no longer essential to support decommissioning operations.
- Transfer of the steam separator and dryer assemblies to the dryer-separator pool for segmentation. Segmentation by weight and activity maximizes the loading of the shielded transport casks. The operations are conducted under water using remotely operated tooling and contamination controls.
- Disconnection of the control blades from the drives on the vessel lower head. Blades are transferred to the spent fuel pool for packaging.
- Disassembly, segmentation, and packaging of the core shroud and in-core guide tubes. Some of the material is expected to exceed Class C disposal requirements. As such, those segments are packaged in modified fuel storage canisters for geologic disposal.
- Removal and segmentation of the remaining internals including the jet pump assemblies, fuel support castings, and core plate assembly.
- Removal of spent fuel storage racks from spent fuel pool, and cleanup of spent fuel pool.
- Draining and decontamination of the reactor well and the permanent sealing of the spent fuel transfer gate. Installation of a shielded platform for segmentation of the reactor vessel. Cutting operations are performed in air using remotely operated equipment within a contamination control envelope, with the water level maintained just below the cut to minimize the working area dose rates. Sections are

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transferred to the dryer-separator pool for packaging and interim storage.

- Disconnection of the control rod drives and instrumentation tubes from the reactor vessel lower head. The lower reactor head and vessel supporting structure are then segmented.
- Removal of the reactor recirculation pumps. Exterior surfaces are decontaminated and openings covered. Components can serve as their own burial containers provided that all penetrations are properly sealed.
- Demolition of the sacrificial shield wall activated concrete by controlled demolition.
- Expansion of the ISFSI and transfer of the spent fuel from the storage pool to the ISFSI pad for interim storage. Spent fuel storage operations continue throughout the active decommissioning period. Fuel transfer to DOE is expected to be completed by the end of the year 2072 (Scenario 1).

At least two years prior to the anticipated date of license termination, an LTP is required. Submitted as a supplement to the Final Safety Analysis Report (FSAR) or its equivalent, the plan must include: a site characterization, description of the remaining dismantling activities, plans for site remediation, procedures for the final radiation survey, designation of the end use of the site, an updated cost estimate to complete the decommissioning, and any associated environmental concerns. The NRC will notice the receipt of the plan, make the plan available for public comment, and schedule a local meeting. LTP approval will be subject to any conditions and limitations as deemed appropriate by the Commission. The licensee may then commence with the final remediation of site facilities and services, including:

- Removal of remaining plant systems and associated components as they become nonessential to the decommissioning program or worker health and safety (e.g., waste collection and treatment systems, electrical power and ventilation systems).
- Removal of the steel liners from the drywell, disposing of the activated and contaminated sections as radioactive waste. Removal of any activated/contaminated concrete.
- Removal of the steel liners from the dryer/separator pool, reactor well, and spent fuel storage pool.
- Surveys of the decontaminated areas of the containment structure.

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- Removal of the contaminated equipment and material from the turbine and radwaste buildings, and any other contaminated facility. Use radiation and contamination control techniques until radiation surveys indicate that the structures can be released for unrestricted access and conventional demolition. This activity may necessitate the dismantling and disposition of most of the systems and components (both clean and contaminated) located within these buildings. This activity will facilitate surface decontamination and subsequent verification surveys required prior to obtaining release for demolition.
- Removal of the remaining components, equipment, and plant services in support of the area release survey(s).
- Routing of material removed in the decontamination and dismantling to a central processing area. Material certified to be free of contamination is released for unrestricted disposition, e.g., as scrap, recycle, or general disposal. Contaminated material is characterized and segregated for additional off-site processing (disassembly, chemical cleaning, volume reduction, and waste treatment), and/or packaged for controlled disposal at a low-level radioactive waste disposal facility.

Incorporated into the LTP is the Final Survey Plan. This plan identifies the radiological surveys to be performed once the decontamination activities are completed and is developed using the guidance provided in the “Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM).”^[26] This document incorporates the statistical approaches to survey design and data interpretation used by the EPA. It also identifies commercially available instrumentation and procedures for conducting radiological surveys. Use of this guidance ensures that the surveys are conducted in a manner that provides a high degree of confidence that applicable NRC criteria are satisfied. Once the survey is complete, the results are provided to the NRC in a format that can be verified. The NRC then reviews and evaluates the information, performs an independent confirmation of radiological site conditions, and makes a determination on the requested change to the operating license (that would release the property, exclusive of the ISFSI, for unrestricted use).

The NRC will amend the operating license to reduce the licensed area to the ISFSI area if it determines that site remediation has been performed in accordance with the LTP, and that the terminal radiation survey and associated documentation demonstrate that the property (exclusive of the ISFSI) is suitable for release.

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2.1.3 Period 3 - Site Restoration

Following completion of decommissioning operations, site restoration activities will begin. Efficient removal of the contaminated materials and verification that residual radionuclide concentrations are below the NRC limits will result in substantial damage to many of the structures. Although performed in a controlled and safe manner, blasting, coring, drilling, scarification (surface removal), and the other decontamination activities will substantially degrade power block structures including the reactor, turbine and radwaste buildings. Under certain circumstances, verifying that subsurface radionuclide concentrations meet NRC site release requirements will require removal of grade slabs and lower floors, potentially weakening footings and structural supports. This removal activity will be necessary for those facilities and plant areas where historical records, when available, indicate the potential for radionuclides having been present in the soil, where system failures have been recorded, or where it is required to confirm that subsurface process and drain lines were not breached over the operating life of the station.

Dismantling of site structures following decommissioning is clearly the most appropriate and cost-effective option. It is unreasonable to anticipate that these structures would be repaired and preserved after the radiological contamination is removed. The effort to dismantle site structures with a work force already mobilized on site is more efficient than if the process were deferred. Site facilities quickly degrade without maintenance, adding additional expense and creating potential hazards to the public as well as to future workers. Abandonment creates a breeding ground for vermin infestation as well as other biological hazards.

This cost study presumes that non-essential structures and site facilities are dismantled as a continuation of the decommissioning activity. Foundations and exterior walls are completely removed, including foundations and basemats, as required by Minnesota regulations. [27] Site areas affected by the dismantling activities are restored and the plant area graded as required to prevent ponding, establish erosion control by the planting of native vegetation, and inhibit the refloating of subsurface materials.

Non-contaminated concrete rubble produced by demolition activities is processed to remove reinforcing steel and miscellaneous embedments. All non-contaminated materials are trucked to an off-site area for

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disposal as construction debris. Subgrade voids are backfilled with clean construction fill, suitable under Minnesota regulations.

2.1.4 ISFSI Operations and Decommissioning

The ISFSI will continue to operate under a general license (10 CFR §50) following the amendment of the operating license to release the adjacent (power block) property. Assuming that Monticello spent fuel shipments begin in 2052, the process is not expected to be completed until 2072 (Scenario 1). Any delay in the transfer process, for example, due to a delay in the scheduled opening of the geologic repository, a slower acceptance rate, or a combination of both, can result in a longer on-site residence time for the fuel discharge from the reactor, as well as additional caretaking expenses. Scenarios 3 and 4 address extended delay periods, which includes the assumption that the spent fuel DSCs will need to be replaced every fifty years.

The assumed design for the ISFSI is based upon the use of a multi-purpose dry shielded storage canister and a NUHOMS horizontal storage module for pad storage.

At the conclusion of the spent fuel transfer process, the ISFSI will be decommissioned. The Commission will terminate the license if it determines that the remediation of the ISFSI has been performed in accordance with an ISFSI license termination plan and that the final radiation survey and associated documentation demonstrate that the facility is suitable for release. Once the requirements are satisfied, the NRC can terminate the license for the ISFSI.

For purposes of this cost analysis, it is assumed that once the DSCs containing the spent fuel assemblies have been removed, any required decontamination is performed on the storage overpacks (some minor neutron-induced activation is assumed), and the license for the facility terminated, the concrete overpacks can be dismantled using conventional techniques for the demolition of reinforced concrete. The concrete storage pad is then removed and the area regraded. This topic is discussed in greater detail in section 3.4.1.

2.2 SAFSTOR

The NRC defines SAFSTOR as "the alternative in which the nuclear facility is placed and maintained in a condition that allows the nuclear facility to be safely stored and subsequently decontaminated (deferred decontamination) to

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levels that permit release for unrestricted use." The facility is left intact (during the dormancy period), with structures maintained in a sound condition. Systems not required to operate in support of the spent fuel pool or site surveillance and security are drained, de-energized, and secured. Minimal cleaning/removal of loose contamination and/or fixation and sealing of remaining contamination are performed. Access to contaminated areas is secured to provide controlled access for inspection and maintenance.

The engineering and planning requirements are similar to those for the DECON alternative. Site preparations are also similar to those for the DECON alternative. However, with the exception of the required radiation surveys and site characterizations, the mobilization and preparation of site facilities is less extensive.

2.2.1 Period 1 - Preparations

Preparations for long-term storage include the planning for permanent defueling of the reactor, revision of technical specifications appropriate to the operating conditions and requirements, a characterization of the facility and major components, and the development of the PSDAR.

The process of placing the plant in safe-storage includes, but is not limited to, the following activities:

- Isolation of the spent fuel storage services and fuel handling systems located in the reactor building so that safe-storage operations may commence on the balance of the plant. This activity may be carried out by plant personnel in accordance with existing operating technical specifications. Activities are scheduled around the fuel handling systems to the greatest extent possible.
- Draining and de-energizing of the non-contaminated systems not required to support continued site operations or maintenance.
- Disposing of contaminated filter elements and resin beds not required for processing wastes from layup activities for future operations.
- Draining of the reactor vessel, with the internals left in place and the vessel head secured.
- Draining and de-energizing non-essential, contaminated systems with decontamination as required for future maintenance and inspection.

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- Preparing lighting and alarm systems whose continued use is required; de-energizing portions of fire protection, electric power, and HVAC systems whose continued use is not required.
- Cleaning of the loose surface contamination from building access pathways.
- Performing an interim radiation survey of plant, posting warning signs where appropriate.
- Erecting physical barriers and/or securing all access to radioactive or contaminated areas, except as required for inspection and maintenance.
- Installing security and surveillance monitoring equipment and relocating security fence around secured structures, as required.

2.2.2 Period 2 - Dormancy

The second phase identified by the NRC in its rule addresses licensed activities during a storage period and is applicable to the dormancy phases of the deferred decommissioning alternatives. Dormancy activities include a 24-hour security force, preventive and corrective maintenance on security systems, area lighting, general building maintenance, heating and ventilation of buildings, routine radiological inspections of contaminated structures, maintenance of structural integrity, and a site environmental and radiation monitoring program. Resident maintenance personnel perform equipment maintenance, inspection activities, routine services to maintain safe conditions, adequate lighting, heating, and ventilation, and periodic preventive maintenance on essential site services.

An environmental surveillance program is carried out during the dormancy period to ensure that releases of radioactive material to the environment are prevented and/or detected and controlled. Appropriate emergency procedures are established and initiated for potential releases that exceed prescribed limits. The environmental surveillance program constitutes an abbreviated version of the program in effect during normal plant operations.

Security during the dormancy period is conducted primarily to protect the spent nuclear fuel while it is on site, prevent unauthorized entry, and to protect the public from the consequences of their own actions. The security fence, sensors, alarms, and other surveillance equipment provide security. Fire and radiation alarms are also monitored and

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maintained. While remote surveillance is an option, it does not offer the immediate response time of a physical presence.

The length of the dormancy period is such that decommissioning (license termination) of the station (excluding the ISFSI) is accomplished within 60 years of final shutdown. During Scenario 5, the transfer of the spent fuel to a DOE facility continues during this period until complete. The Scenario 6 SAFSTOR has the site remain in dormancy following spent fuel removal to the maximum extent possible, such that the licenses are terminated within the required 60-year time period. Scenarios 7 and 8 address extended delay periods, which include the assumption that the spent fuel DSCs will need to be replaced every fifty years.

It is required that the licensee submit an application to terminate each license, along with a LTP (described in Section 2.1.2), thereby initiating delayed decommissioning.

2.2.3 Periods 3 and 4 - Delayed Decommissioning

With the beginning of the third phase, prior to the commencement of decommissioning operations, preparations are undertaken to reactivate site services and prepare for decommissioning. Preparations include engineering and planning, a detailed site characterization, and the assembly of a decommissioning management organization. Final planning for activities and the writing of activity specifications and detailed procedures are also initiated at this time.

Much of the work in developing a termination plan is relevant to the development of the detailed engineering plans and procedures. The activities associated with this phase and the follow-on decontamination and dismantling processes are detailed in Sections 2.1.1 and 2.1.2. The primary difference between the sequences anticipated for the DECON and SAFSTOR scenarios is the absence, in the latter, of any constraint on the availability of the fuel storage pool located within the reactor building for decommissioning.

Variations in the length of the dormancy period are expected to have some effect upon the quantities of radioactive wastes generated from system and structure removal operations. However, given the levels of radioactivity and spectrum of radionuclides expected from approximately sixty years of plant operation, no plant process system identified as being contaminated upon final shutdown will become releasable due to the decay period alone. (i.e., there is no significant

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reduction in the waste generated from the decommissioning activities). Due to the lower activity levels, a greater percentage of the waste volume can be designated for off-site processing and recovery.

The delay in decommissioning also yields lower working area radiation levels. As such, the estimate for the delayed scenarios incorporate reduced ALARA controls for the SAFSTOR's lower occupational exposure potential.

Although the initial radiation levels due to ^{60}Co will substantially decrease during the dormancy period, the internal components of the reactor vessel will still exhibit sufficiently high radiation dose rates to require remote sectioning under water due to the presence of long-lived radionuclides such as ^{94}Nb , ^{59}Ni , and ^{63}Ni . Therefore, the dismantling procedures described for the DECON alternative would still be employed during this scenario. Portions of the sacrificial shield wall will still be radioactive due to the presence of activated trace elements with long half-lives (^{152}Eu and ^{154}Eu). Decontamination will require controlled removal and disposal. It is assumed that radioactive corrosion products on inner surfaces of piping and components will not have decayed to levels that will permit unrestricted use or allow conventional removal. These systems and components will be surveyed as they are removed and disposed of in accordance with the existing radioactive release criteria.

2.2.4 Period 5 - Site Restoration

Following completion of decommissioning operations, site-restoration activities can begin. Dismantling, as a continuation of the decommissioning process, is a cost-effective option, as described in Section 2.1.3. The basis for the dismantling cost in this scenario is consistent with that described for DECON, presuming the removal of structures and site facilities to include the existing foundations and basemats, and the limited restoration of the site.

2.2.5 ISFSI Operations and Decommissioning

For Scenarios 7 and 8, the ISFSI will continue to operate under a general license as authorized by 10 CFR Part 72 following the amendment of the operating license to release the adjacent (power block) property. Assuming that Monticello spent fuel shipments begin in 2118, the process is not expected to be completed until 2130 (Scenario 7). Assuming that Monticello spent fuel shipments begin in 2218, the

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process is not expected to be completed until 2230 (Scenario 8). Any delay in the transfer process, for example, due to a delay in the scheduled opening of the geologic repository, a slower acceptance rate, or a combination of both, can result in a longer on-site residence time for the fuel, as well as additional caretaking expenses. ISFSI operations will include the assumption that the spent fuel DSCs will need to be replaced every fifty years.

Operations and decommissioning activities for Scenarios 7 and 8 during a SAFSTOR scenario proceed in a similar fashion to the Scenario 3 and 4 following DECON, as discussed in Section 2.1.4.

3. COST ESTIMATES

The cost estimates prepared for decommissioning Monticello consider the unique features of the site, including the NSSS, power generation systems, support services, site buildings, and ancillary facilities. The basis of the estimates, including the sources of information relied upon, the estimating methodology employed, site-specific considerations, and other pertinent assumptions, is described in this section.

3.1 BASIS OF ESTIMATES

The estimates were developed using the site-specific, technical information from the 2017 analysis. The plant inventory, the basis for the decontamination and dismantling requirements and cost, and the decommissioning waste streams, was reviewed for this analysis; no substantive changes were identified over the three-year period (between estimate) to the configuration of the plant or site facilities that would impact decommissioning. The site-specific considerations and assumptions used in the previous evaluation were also revisited; no necessary modifications were identified.

3.2 METHODOLOGY

The methodology used to develop the estimates follows the basic approach originally presented in the AIF/NESP-036 study report, "Guidelines for Producing Commercial Nuclear Power Plant Decommissioning Cost Estimates,"^[28] and the DOE "Decommissioning Handbook."^[29] These documents present a unit factor method for estimating decommissioning activity costs, which simplifies the estimating calculations. Unit factors for concrete removal (\$/cubic yard), steel removal (\$/ton), and cutting costs (\$/inch) were developed using local labor rates. The activity-dependent costs were estimated with the item quantities (cubic yards and tons), developed from plant drawings and inventory documents. Removal rates and material costs for the conventional disposition of components and structures relied upon information available in the industry publication, "Building Construction Cost Data," published by RSMeans.^[30]

The unit factor method provides a demonstrable basis for establishing reliable cost estimates. The detail provided in the unit factors, including activity duration, labor costs (by craft), and equipment and consumable costs, ensures that essential elements have not been omitted. Appendix A presents the detailed development of a typical unit factor. Appendix B provides the values contained within one set of factors developed for this analysis.

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Regulatory Guide 1.184 ^[31] describes the methods and procedures that are acceptable to the NRC staff for implementing the requirements that relate to the initial activities and the major phases of the decommissioning process. The costs and schedules presented in this analysis follow the general guidance and sequence in the regulations. The format and content of the estimates is also consistent with the recommendations of Regulatory Guide 1.202. ^[32]

This analysis reflects lessons learned from TLG's involvement in the Shippingport Station Decommissioning Project, completed in 1989, as well as the decommissioning of the Cintichem reactor, hot cells, and associated facilities, completed in 1997. In addition, the planning and engineering for the Rancho Seco, Trojan, Yankee Rowe, Big Rock Point, Maine Yankee, Humboldt Bay-3, Oyster Creek, Connecticut Yankee, Crystal River, Vermont Yankee, Fort Calhoun, Pilgrim, and Indian Point nuclear units have provided additional insight into the process, the regulatory aspects, and the technical challenges of decommissioning commercial nuclear units.

Work Difficulty Factors

The estimates follow the principles of ALARA through the use of work duration adjustment factors. These factors address the impact of activities such as radiological protection instruction, mock-up training, and the use of respiratory protection and protective clothing. The factors lengthen a task's duration, increasing costs and lengthening the overall schedule. ALARA planning is considered in the costs for engineering and planning, and in the development of activity specifications and detailed procedures. Changes to worker exposure limits may impact the decommissioning cost and project schedule.

Work difficulty adjustment factors (WDFs) account for the inefficiencies in working in a power plant environment. The factors are assigned to each unique set of unit cost factors, commensurate with the inefficiencies associated with working in confined, hazardous environments. The ranges used for the WDFs are as follows:

- | | |
|---------------------------------|------------|
| • Access Factor | 10% to 20% |
| • Respiratory Protection Factor | 10% to 50% |
| • Radiation/ALARA Factor | 10% to 40% |
| • Protective Clothing Factor | 10% to 30% |
| • Work Break Factor | 8.33% |

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The factors and their associated range of values were developed in conjunction with the AIF/NESP-036 study. The application of the factors is discussed in more detail in that publication.

Scheduling Program Durations

The unit factors, adjusted by the WDFs as described above, are applied against the inventory of materials to be removed in the radiologically controlled areas. The resulting man-hours, or crew-hours, are used in the development of the decommissioning program schedule, using resource loading and event sequencing considerations. The scheduling of conventional removal and dismantling activities are based upon productivity information available from the RSMeans "Building Construction Cost Data" publication. Dismantling of the fuel handling systems and decontamination of the spent fuel pool is also dependent upon the timetable for the transfer of the spent fuel assemblies from the pool to the ISFSI.

The program schedule is used to determine the period-dependent costs for program management, administration, field engineering, equipment rental, contracted services, etc. The study relies upon regional or site-specific salary and wage rates for the personnel associated with the intended program.

3.3 FINANCIAL COMPONENTS OF THE COST MODEL

TLG's proprietary decommissioning cost model, DECCER, produces a number of distinct cost elements. These direct expenditures, however, do not comprise the total cost to accomplish the project goal, i.e., license termination and site restoration.

3.3.1 Contingency

Inherent in any cost estimate that does not rely on historical data is the inability to specify the precise source of costs imposed by factors such as tool breakage, accidents, illnesses, weather delays, and labor stoppages. In the DECCER cost model, contingency fulfills this role. Contingency is added to each line item to account for costs that are difficult or impossible to develop analytically. Such costs are historically inevitable over the duration of a job of this magnitude; therefore, this cost analysis includes funds to cover these types of expenses.

The activity- and period-dependent costs are combined to develop the total decommissioning cost. A contingency is then applied on a line-item basis, using one or more of the contingency types listed in the

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AIF/NESP-036 study. "Contingencies" are defined in the American Association of Cost Engineers "Project and Cost Engineers' Handbook"^[33] as "specific provision for unforeseeable elements of cost within the defined project scope; particularly important where previous experience relating estimates and actual costs has shown that unforeseeable events which will increase costs are likely to occur." The cost elements in this analysis are based upon ideal conditions and maximum efficiency; therefore, consistent with industry practice, a contingency factor has been applied. In the AIF/NESP-036 study, the types of unforeseeable events that are likely to occur in decommissioning are discussed and guidelines are provided for percentage contingency in each category. It should be noted that contingency, as used in this analysis, does not account for price escalation and inflation in the cost of decommissioning over the remaining operating life of the station.

The use and role of contingency within decommissioning estimates is not a "safety factor issue." Safety factors provide additional security and address situations that may never occur. Contingency funds are expected to be fully expended throughout the program. They also provide assurance that sufficient funding is available to accomplish the intended tasks. An estimate without contingency, or from which contingency has been removed, can disrupt the orderly progression of events and jeopardize a successful conclusion to the decommissioning process.

For example, the most technologically challenging task in decommissioning a commercial nuclear plant is the disposition of the reactor vessel and internal components, now highly radioactive after a lifetime of exposure to core activity. The disposition of these components forms the basis of the critical path (schedule) for decommissioning operations. Cost and schedule are interdependent, and any deviation in schedule has a significant impact on cost for performing a specific activity.

Disposition of the reactor vessel internals involves the underwater cutting of complex components that are highly radioactive. Costs are based upon optimum segmentation, handling, and packaging scenarios. The schedule is primarily dependent upon the turnaround time for the heavily shielded shipping casks, including preparation, loading, and decontamination of the containers for transport. The number of casks required is a function of the pieces generated in the segmentation activity, a value calculated on optimum performance of the tooling employed in cutting the various subassemblies. The expected

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optimization, however, may not be achieved, resulting in delays and additional program costs. For this reason, contingency must be included to mitigate the consequences of the expected inefficiencies inherent in this complex activity, along with related concerns associated with the operation of highly specialized tooling, field conditions, and water clarity.

Contingency funds are an integral part of the total cost to complete the decommissioning process. Exclusion of this component puts at risk a successful completion of the intended tasks and, potentially, subsequent related activities. For this study, TLG examined the major activity-related problems (decontamination, segmentation, equipment handling, packaging, transport, and waste disposal) that necessitate a contingency. Individual activity contingencies ranged from 10% to 75%, depending on the degree of difficulty judged to be appropriate from TLG's actual decommissioning experience. The contingency values used in this study are as follows:

| | |
|--|-----|
| Decontamination | 50% |
| Contaminated Component Removal | 25% |
| Contaminated Component Packaging | 10% |
| Contaminated Component Transport | 15% |
| Low-Level Radioactive Waste Disposal | 25% |
| Low-Level Radioactive Waste Processing | 15% |
| Reactor Segmentation | 75% |
| NSSS Component Removal | 25% |
| Reactor Waste Packaging | 25% |
| Reactor Waste Transport | 25% |
| Reactor Vessel Component Disposal | 50% |
| GTCC Disposal | 15% |
| Staffing | 15% |
| Spent Fuel Management | 15% |
| Non-Radioactive Component Removal | 15% |
| Heavy Equipment and Tooling | 15% |
| Supplies | 25% |
| Engineering | 15% |
| Energy | 15% |
| Insurance and Fees | 10% |

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| | |
|--|-----|
| Characterization and Termination Surveys | 30% |
| Operations and Maintenance Expense | 15% |
| Construction | 15% |
| Property Taxes | 10% |
| ISFSI Decommissioning | 25% |

The contingency values are applied to the appropriate components of the estimates on a line item basis. A composite value is then reported at the end of each detailed estimate (as provided in Appendices C through J). Appendix K, the ISFSI decommissioning calculation, uses a flat 25% contingency added at the end of the calculation.

3.3.2 Financial Risk

In addition to the routine uncertainties addressed by contingency, another cost element that is sometimes necessary to consider when bounding decommissioning costs relates to uncertainty, or risk. Examples can include changes in work scope, pricing, job performance, and other variations that could conceivably, but not necessarily, occur. Consideration is sometimes necessary to generate a level of confidence in the estimate, within a range of probabilities. TLG considers these types of costs under the broad term “financial risk.” Included within the category of financial risk are:

- Transition activities and costs: ancillary expenses associated with eliminating 50% to 80% of the site labor force shortly after the cessation of plant operations, added cost for worker separation packages throughout the decommissioning program, national or company-mandated retraining, and retention incentives for key personnel.
- Delays in approval of the decommissioning plan due to intervention, public participation in local community meetings, legal challenges, and national and local hearings.
- Changes in the project work scope from the baseline estimate, involving the discovery of unexpected levels of contaminants, contamination in places not previously expected, contaminated soil previously undiscovered (either radioactive or hazardous material contamination), variations in plant inventory or configuration not indicated by the as-built drawings.
- Regulatory changes (e.g., affecting worker health and safety, site release criteria, waste transportation, and disposal).

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- Policy decisions altering national commitments (e.g., in the ability to accommodate certain waste forms for disposition) or in the timetable for such, for example, the start and rate of acceptance of spent fuel by the DOE.
- Pricing changes for basic inputs such as labor, energy, materials, and disposal. Items subject to widespread price competition (such as materials) may not show significant variation; however, others such as waste disposal could exhibit large pricing uncertainties, particularly in markets where limited access to services is available.

This cost study does not add any additional costs to the estimate for financial risk, since there is insufficient historical data from which to project future liabilities. Consequently, the areas of uncertainty or risk are revisited periodically and addressed through repeated revisions or updates of the base estimates.

3.4 SITE-SPECIFIC CONSIDERATIONS

There are a number of site-specific considerations that affect the method for dismantling and removal of equipment from the site and the degree of restoration required. The cost impacts of the considerations identified below are included in this cost study.

3.4.1 Spent Fuel Management

The cost to dispose of spent fuel generated from plant operations is not reflected within the estimates to decommission Monticello. Ultimate disposition of the spent fuel is within the province of the DOE's Waste Management System, as defined by the Nuclear Waste Policy Act. As such, the disposal cost was financed by a 1 mill/kWhr surcharge paid into the DOE's waste fund during operations. On November 19, 2013, the U.S. Court of Appeals for the D.C. Circuit ordered the Secretary of the Department of Energy to suspend collecting annual fees for nuclear waste disposal from nuclear power plant operators until the DOE has conducted a legally adequate fee assessment.

The NRC does, however, require licensees to establish a program to manage and provide funding for the management of all irradiated fuel at the reactor site until title of the fuel is transferred to the Secretary of Energy. This requirement is prepared for through inclusion of certain high-level waste cost elements within the estimates, as described below.

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Xcel Energy's current spent fuel management plan for the Monticello spent fuel is based in general upon:

- 1) Fuel transferred from the pool to the ISFSI within 4 years of shutdown;
- 2) Exchange of Prairie Island and Monticello spent fuel acceptance rights to best manage the overall cost of spent fuel storage for both plants;
- 3) Fuel will be shipped in the existing NUHOMS DSCs (Scenarios 1, 2, 5, and 6); the NUHOMS are periodically replaced in Scenarios 3, 4, 7 and 8. Canisters that are unloaded in the spent fuel transfer operation will be surveyed for neutron activation.
- 4) As an allowance, some of these canisters and NUHOMS modules from the first off-load operation are assumed to be mildly neutron activated and therefore must be disposed of as radioactive waste.
- 5) For the 100 and 200 year dry fuel storage scenarios (Scenarios 3, 4, 7 and 8) the canisters and casks will be replaced on a 50 year schedule using a dry transfer facility.
- 6) Currently Monticello is storing spent fuel assemblies at the Morris Operation facility of GE Hitachi Nuclear Energy in Morris, Illinois. These assemblies will be shipped for final disposal to DOE prior to the removal of fuel from the Monticello site.

This analysis assumes that the existing ISFSI is modified at the cessation of plant operations to accommodate the fuel present in the storage pool at shutdown.

The DOE's repository program assumes that spent fuel will be accepted for disposal from the nation's commercial nuclear plants in the order (the "queue") in which it was removed from service ("oldest fuel first").^[34] Repository operations were based upon annual industry-wide receipt of 400 Metric Tons Heavy Metal (MTHM) in the first year of operation, a total of 3,800 MTHM in years 2 through 4 and 3,000 MTHM for year 5 and beyond.^[35] This logic supports the spent fuel schedules for Scenarios 1 and 5. All other spent fuel scenarios are consistent with those identified by the Minnesota PSC.

Operation and maintenance costs for the spent fuel pool and ISFSI are included within the estimates and address the costs for staffing the facility, as well as security, insurance, and licensing fees. The estimates also include the costs to purchase, load, and transfer the NUHOMS

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DSCs from the pool to the ISFSI. Costs are also provided for the final disposition of the ISFSI once the transfer of the DSCs from the ISFSI to the DOE is complete.

Storage Canister Design

The design and capacity of the ISFSI is based upon the Transnuclear NUHOMS system (with a 61-fuel assembly capacity). The system consists of a multi-purpose (storage and transport) dry shielded storage canister (DSC) and a horizontal storage module (HSM). The existing DSCs and HSMs will remain in the ISFSI until either shipment to the DOE, or until recasked.

Canister Loading and Transfer

The estimates include an average cost of \$626,000 for the labor to load/transport the spent fuel from the pool to the ISFSI pad. For estimating purposes an allowance of \$361,000 is used for the cost to transfer each fuel canister from the ISFSI pad to the DOE transport vehicle.

Operations and Maintenance

An annual cost (excluding labor) of approximately \$845,000 and \$112,000 are used for operation and maintenance of the spent fuel pool and the ISFSI, respectively.

At shutdown, the spent fuel pool is expected to contain freshly discharged assemblies (from the most recent refueling cycles). Over the next four years the assemblies are packaged into DSCs for transfer to the ISFSI for transfer to the DOE. It is assumed that the four years provides the necessary cooling period for the final core to meet the decay heat requirements for dry storage. Once the pool is emptied, the spent fuel storage and handling facilities are available for decommissioning.

Replacement of DSCs during ISFSI fuel storage period

Scenarios 1, 2, 5, and 6 do not assume any replacement of the spent fuel storage DSCs (recasking).

The other four cost estimates, Scenarios 3, 4, 7 and 8, include costs to recask the spent fuel, based upon an assumption that the DSC has a limited lifetime of approximately 50 years.

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Scenarios 3 and 7, which are 100 years (nominally) in length, considers two repackaging efforts for each DSC in the ISFSI.

Scenario 4 and 8, which are a (nominal) 200-year scenario, assumes that when any DSC in the ISFSI reaches the 50 years of storage milestone, the DSC is replaced. The fuel will be recasked four times following final shutdown of Monticello.

Since the reactor building, spent fuel storage pool, and fuel handling facilities are removed by the year 2038, a dry fuel transfer facility is assumed to be constructed on site to perform the transfers from the old to the new DSCs. Scenarios 3, 4, 7 and 8 include the cost to construct such a transfer facility, as well as additional staffing positions for support of the dry transfer activities, and additional NRC oversight associated with the transfer operations. The decommissioning of this transfer facility is also included in these scenarios.

ISFSI Decommissioning

In accordance with 10 CFR §72.30, licensees must have a proposed decommissioning plan for the ISFSI site and facilities that includes a cost estimate for the plan. The plan should contain sufficient information on the proposed practices and procedures for the decontamination of the ISFSI and for the disposal of residual radioactive materials after all spent fuel, high-level radioactive waste, and reactor-related GTCC waste have been removed.

The NUHOMS multi-purpose dry shielded storage canister with a horizontal, reinforced concrete storage module is used as a basis for the ISFSI decommissioning cost analyses. The modules are assumed to have some level of neutron-induced activation, as a result of the long-term storage of the fuel, i.e., to levels exceeding free-release limits. As an allowance, 8 modules are assumed to require remediation, equivalent to the number of modules required to accommodate the final core offload at Monticello (484 assemblies). The cost of the disposition of this material, as well as the demolition of the ISFSI facility, is included in the estimates.

In accordance with the specific requirements of 10 CFR §72.30 for the ISFSI work scope, the cost estimate for decommissioning the ISFSI reflects: 1) the cost of an independent contractor performing the decommissioning activities; 2) an adequate contingency factor; and 3) the cost of meeting the criteria for unrestricted use. The cost summary

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for decommissioning the ISFSI is presented in Appendix K. It contains four different scenarios reflecting the different number of casks present at the end of the ISFSI operations. The demolition of the ISFSI for all eight scenarios is reflected within the estimates.

GTCC

The dismantling of the reactor internals is expected to generate radioactive waste considered unsuitable for shallow land disposal (i.e., low-level radioactive waste with concentrations of radionuclides that exceed the limits established by the NRC for Class C radioactive waste (GTCC)). The Low-Level Radioactive Waste Policy Amendments Act of 1985 assigned the federal government the responsibility for the disposal of this material. The Act also stated that the beneficiaries of the activities resulting in the generation of such radioactive waste bear all reasonable costs of disposing of such waste. ^[36]

Although the material is not classified as high-level waste, federal regulations under the Act designate that disposal of this material is a federal responsibility under Section 3(b)(1)(D). However, the DOE has not been forthcoming with an acceptance criteria or disposition schedule for this material, and numerous questions remain as to the ultimate disposal cost and waste form requirements.

As such, for purposes of this study, the GTCC has been packaged and disposed of in the same manner as high-level waste, at a cost equivalent to that envisioned for the spent fuel. The number of DSCs required and the packaged volume for GTCC was based upon experience at Maine Yankee (e.g., the constraints on loading as identified in the canister's certificate of compliance), but adjusted for the increased spent fuel capacity of the current DSCs.

It is assumed that the DOE would not accept this waste prior to completing the transfer of spent fuel. Therefore, until such time the DOE is ready to accept GTCC waste, it is reasonable to assume that this material would remain in storage at Monticello (for the four DECON scenarios (1 through 4) and the SAFSTOR scenarios 7 and 8. alternatives). In SAFSTOR scenarios 5 and 6, the GTCC material is shipped directly to a DOE facility as it is generated since the fuel will have been removed from the site prior to the completion of delayed dismantling. GTCC costs have been segregated and included within the "License Termination" expenditures.

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3.4.2 Reactor Vessel and Internal Components

In the DECON scenarios, the reactor coolant system components are assumed to be decontaminated using chemical agents prior to the start of cutting operations. This type of decontamination can be expected to have a significant ALARA impact in the DECON scenarios, since the removal work is done within the first few years of shutdown. A decontamination factor (average reduction) of 10 is assumed for the process. Disposal of the decontamination solution effluent is included within the estimate as a "process liquid waste" charge. The SAFSTOR scenarios do not include any decontamination of the reactor system; radioactive decay from the delay period in the dormancy results in similar results.

The reactor pressure vessel and internal components are segmented for disposal in shielded, reusable transportation casks. Segmentation is performed underwater in the dryer-separator pool, where a turntable and remote cutter are installed. The vessel is segmented in place, using a mast-mounted cutter supported off the lower head and directed from a shielded work platform installed overhead in the reactor well. Transportation cask specifications and transportation regulations dictate the segmentation and packaging methodology.

Intact disposal of reactor vessel shells has been successfully demonstrated at several of the sites that have been decommissioned. Access to navigable waterways has allowed these large packages to be transported to the Barnwell disposal site with minimal overland travel. Intact disposal of the reactor vessel and internal components can provide savings in cost and worker exposure by eliminating the complex segmentation requirements, isolation of the GTCC material, and transport/storage of the resulting waste packages. Portland General Electric (PGE) was able to dispose of the Trojan reactor as an intact package (including the internals). However, its location on the Columbia River simplified the transportation analysis since:

- the reactor package could be secured to the transport vehicle for the entire journey, i.e., the package was not lifted during transport,
- there were no man-made or natural terrain features between the plant site and the disposal location that could produce a large drop, and

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- transport speeds were very low, limited by the overland transport vehicle and the river barge.

As a member of the Northwest Compact, PGE had a site available for disposal of the package - the US Ecology facility in Washington State. The characteristics of this arid site proved favorable in demonstrating compliance with land disposal regulations.

It is not known whether this option will be available when Monticello ceases operation. Future viability of this option will depend upon the ultimate location of the disposal site, as well as the disposal site licensee's ability to accept highly radioactive packages and effectively isolate them from the environment. Additionally, with BWRs, the diameter of the reactor vessel may severely limit overland transport. Consequently, the study assumes the reactor vessel will require segmentation, as a bounding condition.

3.4.3 Primary System Components

Reactor recirculation piping is cut from the reactor vessel once the water level in the vessel (used for personnel shielding during dismantling and cutting operations in and around the vessel) is dropped below the nozzle zone. The piping is boxed and transported by shielded van. The reactor recirculation pumps and motors are lifted out intact, packaged, and transported for processing and/or disposal.

3.4.4 Main Turbine and Condenser

The main turbine will be dismantled using conventional maintenance procedures. The turbine rotors and shafts will be removed to a laydown area. The lower turbine casings will be removed from their anchors by controlled demolition. The main condensers will also be disassembled and moved to a laydown area. Material is then prepared for transportation to an off-site recycling facility where it will be surveyed and designated for either decontamination or volume reduction, or controlled disposal. Components will be packaged and readied for transport in accordance with the intended disposition.

3.4.5 Transportation Methods

Contaminated piping, components, and structural material other than the highly activated reactor vessel and internal components will qualify as LSA-I, II or III or Surface Contaminated Object, SCO-I or II, as

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described in Title 49.^[37] The contaminated material will be packaged in Industrial Packages (IP-1, IP-2, or IP-3, as defined in subpart 10 CFR 173.411) for transport unless demonstrated to qualify as their own shipping containers. The reactor vessel and internal components are expected to be transported in accordance with 10 CFR Part 71, as Type B. It is conceivable that the reactor, due to its limited specific activity, could qualify as LSA II or III. However, the high radiation levels on the outer surface would require that additional shielding be incorporated within the packaging so as to attenuate the dose to levels acceptable for transport.

Any fuel cladding failure that occurred during the lifetime of the plant is assumed to have released fission products at sufficiently low levels that the buildup of quantities of long-lived isotopes (e.g., ¹³⁷Cs, ⁹⁰Sr, or transuranics) has been prevented from reaching levels exceeding those that permit the major reactor components to be shipped under current transportation regulations and disposal requirements.

Transport of the highly activated metal, produced in the segmentation of the reactor vessel and internal components, will be by shielded truck cask. Cask shipments may exceed 95,000 pounds, including vessel segment(s), supplementary shielding, cask tie-downs, and tractor-trailer. The maximum level of activity per shipment assumed permissible was based upon the license limits of the available shielded transport casks. The segmentation scheme for the vessel and internal segments is designed to meet these limits.

Transportation costs for Class A radioactive material requiring controlled disposal are based upon the mileage to the EnergySolutions facility in Clive, Utah. Transportation costs for the higher activity Class B and C radioactive material are based upon the mileage to the WCS facility in Andrews County, Texas. The transportation cost for the GTCC material is assumed to be contained within the disposal cost. Transportation costs for off-site waste processing are based upon the mileage to Oak Ridge, Tennessee. Truck transport costs were estimated using published tariffs from Tri-State Motor Transit.^[38]

3.4.6 Low-Level Radioactive Waste Disposal

To the greatest extent practical, metallic material generated in the decontamination and dismantling processes is processed to reduce the total cost of controlled disposal. Material meeting the regulatory and/or site release criterion, is released as scrap, requiring no further cost

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consideration. Conditioning (preparing the material to meet the waste acceptance criteria of the disposal site) and recovery of the waste stream is performed off site at a licensed processing center. Any material leaving the site is subject to a survey and release charge, at a minimum.

The mass of radioactive waste generated during the various decommissioning activities at the site is shown on a line-item basis in the detailed Appendices C through J, and summarized in Section 5. The quantified waste summaries shown in these tables are consistent with 10 CFR Part 61 classifications. Commercially available steel containers are presumed to be used for the disposal of piping, small components, and concrete. Larger components can serve as their own containers, with proper closure of all openings, access ways, and penetrations. The volumes are calculated based on the exterior package dimensions for containerized material or a specific calculation for components serving as their own waste containers.

The more highly activated reactor components will be shipped in reusable, shielded truck casks with disposable liners. In calculating disposal costs, the burial fees are applied against the liner volume and weight, with surcharges added for the special handling requirements and the radiological characteristics of the payload. Packaging efficiencies are lower for the highly activated materials (greater than Type A quantity waste), where high concentrations of gamma-emitting radionuclides limit the capacity of the shipping canisters.

The cost to dispose of the lowest level and majority of the material generated from the decontamination and dismantling activities is based upon representative costs for disposal at *EnergySolutions* facility in Clive, Utah. Disposal costs for the higher activity waste (Class B and C) were based upon preliminary and indicative information from WCS for the Andrews County facility.

Material exceeding Class C limits (limited to material closest to the reactor core and comprising less than 1% of the total waste volume) is generally not suitable for shallow-land disposal. This material is packaged in the same multipurpose canisters used for spent fuel storage/transport, for eventual transfer to the DOE for disposal.

3.4.7 Site Conditions Following Decommissioning

The NRC will amend or terminate the unit license if it determines that site remediation has been performed in accordance with the license

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termination plan, and that the terminal radiation survey and associated documentation demonstrate that the facility is suitable for release. The NRC's involvement in the decommissioning process will end at this point. Building codes and environmental regulations will dictate the next step in the decommissioning process, as well as Xcel Energy's own future plans for the site, e.g., the electrical switchyard will remain in support of the regional transmission and distribution system.

Asphalt surfaces in the immediate vicinity of site buildings are broken up and the material disposed of as construction debris. The site access road will remain.

Only existing site structures are considered in the dismantling cost. All subgrade structures are removed. The voids are backfilled with clean debris and capped with soil. The site is then re-graded to conform to the adjacent landscape. Vegetation is established to inhibit erosion. These "non-radiological costs" are included in the total cost of decommissioning.

Bulk excavation of soil and material in the immediate vicinity of the reactor building is included to remove various duct banks, catch basins, and underground utilities that may exist.

The estimates do not assume the remediation of any significant volume of contaminated soil. This assumption may be affected by continued plant operations and/or future regulatory actions, such as the development of site-specific release criteria.

3.5 ASSUMPTIONS

The following are the major assumptions made in the development of the estimates for decommissioning the site.

3.5.1 Estimating Basis

Decommissioning costs are reported in the year of projected expenditure; however, the values are provided in 2020 dollars. Costs are not inflated, escalated, or discounted over the periods of performance.

The estimates rely upon the physical plant inventory that was the basis for the 2017 analysis (updated to reflect any material changes to the plant over the past three years).

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The study follows the principles of ALARA through the use of work duration adjustment factors. These factors address the impact of activities such as radiological protection instruction, mock-up training, and the use of respiratory protection and protective clothing. The factors lengthen a task's duration, increasing costs and lengthening the overall schedule. ALARA planning is considered in the costs for engineering and planning, and in the development of activity specifications and detailed procedures. Changes to worker exposure limits may impact the decommissioning cost and project schedule.

3.5.2 Labor Costs

For purposes of this analysis, it is assumed that Xcel Energy will hire a Decommissioning Operations Contractor (DOC) to manage the decommissioning. Xcel Energy will provide site security, radiological health and safety, quality assurance and overall site administration during the decommissioning and demolition phases. Contract personnel will provide engineering services (e.g., for preparing the activity specifications, work procedures, neutron activation, and structural analyses) under the direction of Xcel Energy.

Utility labor costs were provided by Xcel Energy. Average costs were provided by department or work group and included payroll overheads. Decommissioning Operations Contractor (DOC) labor costs were based on utility labor costs with modified markups to account for employee benefits, DOC overhead and profit.

The craft labor required to decontaminate and dismantle the nuclear station will be acquired through standard site contracting practices. Craft labor costs were based upon information from Xcel Energy. Craft labor costs include applicable overheads and profit.

Security levels are assumed to be maintained at "operating levels" for approximately 18 months after operations ceases. Additional reductions in force size are assumed when the pool is empty and with the completion of the decommissioning and site restoration activities.

Staffing levels are assigned by sub-period and functional area. The types of positions and staffing levels are adjusted based upon the type of activity occurring in each sub-period.

Representative profiles of the staffing level for decommissioning, including contractors and craft, is provided in Figures 3.1 and 3.2 for the

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DECON (Scenario 2) and SAFSTOR (Scenario 6) estimates. Utility staffing levels will gradually decrease after completing the removal of physical systems. Staffing levels and management support will vary based upon the amount and type of decommissioning work. Craft manpower levels decrease after systems removal and structures decontamination and drop substantially during the delay period and the license termination survey period. However, craft levels increase again during the site restoration period due to the work associated with structures demolition.

Security, while reduced from operating levels, is maintained throughout the decommissioning for access control, material control, and to safeguard the spent fuel (in accordance with the requirements of 10 CFR Part 37, Part 72, and Part 73). Once the fuel has been transferred to the DOE in Scenarios 5 and 6, the security organization will be reduced to Part 37 requirements.

3.5.3 Design Conditions

Any fuel cladding failure that occurred during the lifetime of the plant is assumed to have released fission products at sufficiently low levels that the buildup of quantities of long-lived isotopes (e.g., ¹³⁷Cs, ⁹⁰Sr, or transuranics) has been prevented from reaching levels exceeding those that permit the major NSSS components to be shipped under current transportation regulations and disposal requirements.

The curie contents of the vessel and internals at final shutdown are derived from those listed in NUREG/CR-3474.^[39] Actual estimates are derived from the curie/gram values contained therein and adjusted for the different mass of the Monticello components, projected operating life, and different periods of decay. Additional short-lived isotopes were derived from NUREG/CR-0130^[40] and NUREG/CR-0672,^[41] and benchmarked to the long-lived values from NUREG/CR-3474.

The disposal cost for the control blades removed from the vessel with the final core load was included within the estimates. Control blade residence time in the reactor is assumed to be controlled such that the blades do not become GTCC material. Disposition of any blades stored in the pool from operations was considered an operating expense and therefore not accounted for in the estimates.

Neutron activation of the reactor building structure is confined to the reactor sacrificial shield.

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3.5.4 General

Transition Activities

Existing warehouses will be cleared of non-essential material and remain for use by Xcel Energy and subcontractors. The plant's operating staff will perform the following activities at no additional cost or credit to the project during the transition period:

- Drain and collect fuel oils, lubricating oils, and transformer oils for recycle and/or sale.
- Drain and collect acids, caustics, and other chemical stores for recycle and/or sale.
- Processes operating waste inventories, i.e., the estimates do not address the disposition of any legacy wastes; the disposal of operating wastes during this initial period is not considered a decommissioning expense.

Scrap and Salvage

The existing plant equipment is considered obsolete and suitable for scrap as deadweight quantities only. Xcel Energy will make economically reasonable efforts to salvage equipment following final plant shutdown. However, dismantling techniques assumed by TLG for equipment in this analysis are not consistent with removal techniques required for salvage (resale) of equipment. Experience has indicated that some buyers wanted equipment stripped down to very specific requirements before they would consider purchase. This required expensive rework after the equipment had been removed from its installed location. Since placing a salvage value on this machinery and equipment would be speculative, and the value would be small in comparison to the overall decommissioning expenses, this analysis does not attempt to quantify the possible salvage value that Xcel Energy may realize based upon those efforts.

It is assumed, for purposes of this analysis, that any value received from the sale of scrap generated in the dismantling process would be offset by the on-site processing costs. The dismantling techniques assumed in the decommissioning estimates do not include the additional cost for size reduction and preparation to meet "furnace ready" conditions. For example, the recovery of copper from electrical cabling may require the removal and disposition of any contaminated insulation, an added

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expense. With a volatile market, the potential profit margin in scrap recovery is highly speculative, regardless of the ability to free release this material. This assumption is an implicit recognition of scrap value in the disposal of clean metallic waste at no additional cost to the project.

Furniture, tools, mobile equipment such as forklifts, trucks, bulldozers, and other property will be removed at no cost or credit to the decommissioning project. Disposition may include relocation to other facilities. Spare parts will also be made available for alternative use.

The concrete debris resulting from building demolition activities is crushed on site to reduce the size of the debris. The resulting crushed concrete is disposed offsite as construction debris. The rebar removed from the concrete crushing process is disposed of as scrap steel in a similar fashion as other scrap metal as discussed previously.

Energy

For estimating purposes, the plant is assumed to be de-energized, except for those facilities associated with spent fuel storage. Replacement power costs are used for the cost of energy consumption during decommissioning for tooling, lighting, ventilation, and essential services.

Emergency Planning

FEMA and state fees associated with emergency planning are assumed to continue for approximately 12 months following the cessation of operations. At this time, the FEMA fees are discontinued. The timing is based upon the anticipated condition of the spent fuel (i.e., the hottest spent fuel assemblies are assumed to be cool enough that no substantial Zircaloy oxidation and off-site event would occur with the loss of spent fuel pool water). State and local fees are continued until all spent fuel is transferred out of the spent fuel pool.

Insurance

Costs for continuing coverage (nuclear liability and property insurance) following cessation of plant operations and during decommissioning are included and based upon current operating premiums. Reductions in premiums, throughout the decommissioning process, are based upon the guidance provided in SECY-00-0145, "Integrated Rulemaking Plan for Nuclear Power Plant Decommissioning."^[42] The NRC's financial

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protection requirements are based on various reactor (and spent fuel) configurations.

Site Non-Labor Overhead

These estimates include costs for site non-labor overhead charges. These costs include telephones, copy machines, computers, IT infrastructure, office supplies, janitorial supplies, training expenses, etc. Xcel Energy provided a two-part cost to address these costs. A variable charge of \$7,389 per person per year of the Xcel Energy staff is included throughout the estimate. A fixed annual overhead charge is also included, starting at \$2.7 million at the time of unit shut down and decreasing at various intervals to approximately \$108 thousand per reactor.

Severance Program

Severance for personnel retained for the decommissioning organization is included in this estimate.

Taxes

Property taxes are included for all decommissioning periods. Xcel Energy provided a schedule of decreasing tax payments against the current tax assessment. These payments are maintained for the balance of the decommissioning program.

NRC Fees

These estimates include charges from the NRC to support the Monticello decommissioning program. Charges are included for the yearly license held by Xcel Energy for the Part 50 license, as well as engineering support charges by the NRC to review activities at the site. The Part 50 license fee for a reactor in a decommissioning or possession-only status and which has spent fuel onsite is \$188 thousand per year. Once the reactor has been decommissioned, the site Part 50 license continues at the same fee until final removal of the spent fuel. The hourly rate for NRC review is \$279.00. The level of effort of NRC participation is commensurate with the decommissioning alternative and schedule.

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Disposal of Processed Water

This estimate assumes that processed water which meets state and federal release limits can be disposed of without additional cost.

Site Modifications

The perimeter fence and in-plant security barriers will be moved, as appropriate, to conform to the Site Security Plan in force during the various stages of the project.

Morris Facility Payments

This estimate includes a yearly cost of \$63 thousand to pay for the storage of spent fuel at the Morris facility.

Minnesota state regulations regarding concrete

This estimate complies with the Minnesota state regulations regarding the removal of all subterranean concrete during demolition, plus the survey and confirmation of the suitability of the clean fill used for backfill of the subgrade structures following concrete removal.

3.6 COST ESTIMATE SUMMARY

The estimates presented in this document reflects the total cost to decontaminate the nuclear unit, manage the spent fuel until the DOE is able to complete the transfer to a federal facility, dismantle the plant and restore the site for alternative use.

Schedules of expenditures are provided in Tables 3.1 through 3.8. The tables delineate the cost contributors by year of expenditures as well as cost contributor (e.g., labor, materials, and waste disposal).

Additional tables in Appendices C through J provide detailed costs elements. The cost elements are also assigned to one of three subcategories: "License Termination," "Spent Fuel Management," and "Site Restoration." The subcategory "License Termination" is used to accumulate costs that are consistent with "decommissioning" as defined by the NRC in its financial assurance regulations (i.e., 10 CFR §50.75). In situations where the long-term management of spent fuel is not an issue, the cost reported for this subcategory is generally sufficient to terminate the unit's operating license, recognizing that there may be some additional cost impact from spent fuel management.

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The “Spent Fuel Management” subcategory contains costs associated with the containerization and transfer of spent fuel from the pool to the ISFSI for interim storage, and the transfer of the multipurpose canisters from the ISFSI to the DOE. Costs are also included for the operations of the pool and management of the ISFSI until such time that the transfer of all fuel from this facility to an off-site location (e.g., interim storage facility) is complete.

“Site Restoration” is used to capture costs associated with the dismantling and demolition of buildings and facilities demonstrated to be free from contamination. This includes structures never exposed to radioactive materials, as well as those facilities that have been decontaminated to appropriate levels. Structures are completely removed, including foundations and basemats and backfilled to conform to local grade.

As discussed in Section 3.4.1, it is assumed that the DOE will not accept the GTCC waste prior to completing the transfer of spent fuel. Therefore, the cost of GTCC disposal is shown in the final year of ISFSI operation (for the DECON alternative). While designated for disposal at a federal facility along with the spent fuel, GTCC waste is still classified as low-level radioactive waste and, as such, included as a “License Termination” expense.

Decommissioning costs are reported in 2020 dollars. Costs are not inflated, escalated, or discounted over the period of expenditure (or projected lifetime of the plant).

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TABLE 3.1
SCENARIO 1: DECON WITH 42 YEAR DFS
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|------|--------|--------------------------|--------|--------|--------|---------|
| 2030 | 22,676 | 1,092 | 658 | 20 | 7,605 | 32,050 |
| 2031 | 77,447 | 8,635 | 2,747 | 1,362 | 34,052 | 124,243 |
| 2032 | 85,158 | 36,726 | 2,393 | 59,659 | 32,197 | 216,132 |
| 2033 | 95,842 | 65,825 | 1,830 | 56,740 | 27,821 | 248,058 |
| 2034 | 97,504 | 77,212 | 1,336 | 29,642 | 22,782 | 228,476 |
| 2035 | 53,100 | 4,702 | 601 | 11,794 | 5,834 | 76,030 |
| 2036 | 38,067 | 12,606 | 250 | 9 | 4,045 | 54,977 |
| 2037 | 32,985 | 14,093 | 193 | 0 | 3,929 | 51,199 |
| 2038 | 6,573 | 594 | 0 | 0 | 2,511 | 9,678 |
| 2039 | 7,473 | 3,294 | 0 | 0 | 2,511 | 13,278 |
| 2040 | 7,850 | 4,373 | 0 | 0 | 2,518 | 14,742 |
| 2041 | 6,375 | 0 | 0 | 0 | 2,511 | 8,887 |
| 2042 | 6,375 | 0 | 0 | 0 | 2,511 | 8,887 |
| 2043 | 6,375 | 0 | 0 | 0 | 2,511 | 8,887 |
| 2044 | 6,393 | 0 | 0 | 0 | 2,518 | 8,911 |
| 2045 | 6,375 | 0 | 0 | 0 | 2,511 | 8,887 |
| 2046 | 6,375 | 0 | 0 | 0 | 2,511 | 8,887 |
| 2047 | 6,375 | 0 | 0 | 0 | 2,511 | 8,887 |
| 2048 | 7,112 | 2,158 | 0 | 0 | 2,518 | 11,789 |
| 2049 | 6,375 | 0 | 0 | 0 | 2,511 | 8,887 |
| 2050 | 6,375 | 0 | 0 | 0 | 2,511 | 8,887 |
| 2051 | 6,375 | 0 | 0 | 0 | 2,511 | 8,887 |
| 2052 | 6,496 | 311 | 0 | 0 | 2,518 | 9,326 |
| 2053 | 6,686 | 934 | 0 | 0 | 2,511 | 10,132 |
| 2054 | 6,583 | 623 | 0 | 0 | 2,511 | 9,717 |
| 2055 | 6,583 | 623 | 0 | 0 | 2,511 | 9,717 |
| 2056 | 7,015 | 1,868 | 0 | 0 | 2,518 | 11,402 |
| 2057 | 6,894 | 1,557 | 0 | 0 | 2,511 | 10,962 |
| 2058 | 6,894 | 1,557 | 0 | 0 | 2,511 | 10,962 |
| 2059 | 6,894 | 1,557 | 0 | 0 | 2,511 | 10,962 |

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TABLE 3.1 (continued)
SCENARIO 1: DECON WITH 42 YEAR DFS
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|--------------|----------------|--------------------------|---------------|----------------|----------------|------------------|
| 2060 | 6,704 | 934 | 0 | 0 | 2,518 | 10,156 |
| 2061 | 6,583 | 623 | 0 | 0 | 2,511 | 9,717 |
| 2062 | 6,686 | 934 | 0 | 0 | 2,511 | 10,132 |
| 2063 | 6,583 | 623 | 0 | 0 | 2,511 | 9,717 |
| 2064 | 6,600 | 623 | 0 | 0 | 2,518 | 9,741 |
| 2065 | 6,686 | 934 | 0 | 0 | 2,511 | 10,132 |
| 2066 | 6,583 | 623 | 0 | 0 | 2,511 | 9,717 |
| 2067 | 6,583 | 623 | 0 | 0 | 2,511 | 9,717 |
| 2068 | 6,704 | 934 | 0 | 0 | 2,518 | 10,156 |
| 2069 | 6,790 | 1,245 | 0 | 0 | 2,511 | 10,547 |
| 2070 | 6,583 | 623 | 0 | 0 | 2,511 | 9,717 |
| 2071 | 6,790 | 1,245 | 0 | 0 | 2,511 | 10,547 |
| 2072 | 6,808 | 2,599 | 0 | 0 | 7,470 | 16,877 |
| 2073 | 1,956 | 1,431 | 22 | 7,406 | 4,691 | 15,507 |
| | | | | | | |
| Total | 738,239 | 254,331 | 10,030 | 166,633 | 235,871 | 1,405,104 |

Note: Columns may not add due to rounding

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TABLE 3.2
SCENARIO 2: DECON WITH 60 YEAR DFS
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|------|--------|--------------------------|--------|--------|--------|---------|
| 2030 | 22,676 | 1,092 | 658 | 20 | 7,605 | 32,050 |
| 2031 | 77,447 | 8,635 | 2,747 | 1,362 | 34,052 | 124,243 |
| 2032 | 85,158 | 36,726 | 2,393 | 59,659 | 32,197 | 216,132 |
| 2033 | 95,842 | 65,825 | 1,830 | 56,740 | 27,821 | 248,058 |
| 2034 | 97,504 | 77,212 | 1,336 | 29,642 | 22,782 | 228,476 |
| 2035 | 52,998 | 4,394 | 601 | 11,794 | 5,834 | 75,620 |
| 2036 | 37,293 | 10,285 | 250 | 9 | 4,045 | 51,882 |
| 2037 | 32,061 | 11,322 | 193 | 0 | 3,925 | 47,501 |
| 2038 | 6,393 | 54 | 0 | 0 | 2,465 | 8,912 |
| 2039 | 6,393 | 54 | 0 | 0 | 2,465 | 8,912 |
| 2040 | 6,411 | 54 | 0 | 0 | 2,472 | 8,936 |
| 2041 | 6,393 | 54 | 0 | 0 | 2,465 | 8,912 |
| 2042 | 6,393 | 54 | 0 | 0 | 2,465 | 8,912 |
| 2043 | 6,393 | 54 | 0 | 0 | 2,465 | 8,912 |
| 2044 | 6,411 | 54 | 0 | 0 | 2,472 | 8,936 |
| 2045 | 6,393 | 54 | 0 | 0 | 2,465 | 8,912 |
| 2046 | 6,393 | 54 | 0 | 0 | 2,465 | 8,912 |
| 2047 | 6,393 | 54 | 0 | 0 | 2,465 | 8,912 |
| 2048 | 7,130 | 2,212 | 0 | 0 | 2,472 | 11,814 |
| 2049 | 6,393 | 54 | 0 | 0 | 2,465 | 8,912 |
| 2050 | 8,012 | 4,910 | 0 | 0 | 2,465 | 15,387 |
| 2051 | 8,012 | 4,910 | 0 | 0 | 2,465 | 15,387 |
| 2052 | 8,749 | 7,070 | 0 | 0 | 2,472 | 18,291 |
| 2053 | 9,272 | 8,690 | 0 | 0 | 2,465 | 20,427 |
| 2054 | 8,192 | 5,450 | 0 | 0 | 2,465 | 16,107 |
| 2055 | 9,092 | 8,150 | 0 | 0 | 2,465 | 19,707 |
| 2056 | 9,469 | 9,230 | 0 | 0 | 2,472 | 21,171 |
| 2057 | 6,375 | 0 | 0 | 0 | 2,465 | 8,840 |
| 2058 | 6,375 | 0 | 0 | 0 | 2,465 | 8,840 |
| 2059 | 6,375 | 0 | 0 | 0 | 2,465 | 8,840 |

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TABLE 3.2 (continued)
SCENARIO 2: DECON WITH 60 YEAR DFS
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|------|-------|--------------------------|--------|--------|-------|--------|
| 2060 | 6,393 | 0 | 0 | 0 | 2,472 | 8,864 |
| 2061 | 6,375 | 0 | 0 | 0 | 2,465 | 8,840 |
| 2062 | 6,375 | 0 | 0 | 0 | 2,465 | 8,840 |
| 2063 | 6,375 | 0 | 0 | 0 | 2,465 | 8,840 |
| 2064 | 6,393 | 0 | 0 | 0 | 2,472 | 8,864 |
| 2065 | 6,375 | 0 | 0 | 0 | 2,465 | 8,840 |
| 2066 | 6,375 | 0 | 0 | 0 | 2,465 | 8,840 |
| 2067 | 6,375 | 0 | 0 | 0 | 2,465 | 8,840 |
| 2068 | 6,393 | 0 | 0 | 0 | 2,472 | 8,864 |
| 2069 | 6,375 | 0 | 0 | 0 | 2,465 | 8,840 |
| 2070 | 6,375 | 0 | 0 | 0 | 2,465 | 8,840 |
| 2071 | 6,375 | 0 | 0 | 0 | 2,465 | 8,840 |
| 2072 | 6,393 | 0 | 0 | 0 | 2,472 | 8,864 |
| 2073 | 6,375 | 0 | 0 | 0 | 2,465 | 8,840 |
| 2074 | 6,375 | 0 | 0 | 0 | 2,465 | 8,840 |
| 2075 | 6,375 | 0 | 0 | 0 | 2,465 | 8,840 |
| 2076 | 6,393 | 0 | 0 | 0 | 2,472 | 8,864 |
| 2077 | 6,375 | 0 | 0 | 0 | 2,465 | 8,840 |
| 2078 | 6,894 | 1,557 | 0 | 0 | 2,465 | 10,916 |
| 2079 | 6,998 | 1,868 | 0 | 0 | 2,465 | 11,331 |
| 2080 | 6,911 | 1,557 | 0 | 0 | 2,472 | 10,940 |
| 2081 | 6,894 | 1,557 | 0 | 0 | 2,465 | 10,916 |
| 2082 | 6,894 | 1,557 | 0 | 0 | 2,465 | 10,916 |
| 2083 | 6,998 | 1,868 | 0 | 0 | 2,465 | 11,331 |
| 2084 | 6,911 | 1,557 | 0 | 0 | 2,472 | 10,940 |
| 2085 | 6,894 | 1,557 | 0 | 0 | 2,465 | 10,916 |
| 2086 | 6,894 | 1,557 | 0 | 0 | 2,465 | 10,916 |
| 2087 | 6,998 | 1,868 | 0 | 0 | 2,465 | 11,331 |
| 2088 | 7,631 | 3,715 | 0 | 0 | 2,472 | 13,818 |
| 2089 | 6,894 | 1,557 | 0 | 0 | 2,465 | 10,916 |

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TABLE 3.2 (continued)
SCENARIO 2: DECON WITH 60 YEAR DFS
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|--------------|----------------|--------------------------|---------------|----------------|----------------|------------------|
| 2090 | 6,583 | 1,976 | 0 | 0 | 7,419 | 15,978 |
| 2091 | 1,956 | 1,431 | 22 | 7,406 | 4,691 | 15,507 |
| | | | | | | |
| Total | 865,580 | 291,889 | 10,030 | 166,633 | 278,631 | 1,612,762 |

Note: Columns may not add due to rounding

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TABLE 3.3
SCENARIO 3: DECON WITH 100 YEAR DFS
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|------|--------|--------------------------|--------|--------|--------|---------|
| 2030 | 22,676 | 1,092 | 658 | 20 | 7,605 | 32,050 |
| 2031 | 77,872 | 9,912 | 2,747 | 1,362 | 34,052 | 125,946 |
| 2032 | 87,105 | 42,568 | 2,393 | 59,659 | 32,197 | 223,922 |
| 2033 | 97,150 | 69,747 | 1,830 | 56,740 | 27,821 | 253,288 |
| 2034 | 97,504 | 77,212 | 1,336 | 29,642 | 22,782 | 228,476 |
| 2035 | 52,998 | 4,394 | 601 | 11,794 | 5,834 | 75,620 |
| 2036 | 37,468 | 10,398 | 250 | 3,307 | 4,603 | 56,026 |
| 2037 | 32,364 | 11,447 | 193 | 3,754 | 4,559 | 52,317 |
| 2038 | 7,761 | 54 | 0 | 0 | 2,452 | 10,267 |
| 2039 | 7,761 | 54 | 0 | 0 | 2,452 | 10,267 |
| 2040 | 7,783 | 54 | 0 | 0 | 2,458 | 10,295 |
| 2041 | 7,761 | 54 | 0 | 0 | 2,452 | 10,267 |
| 2042 | 7,761 | 54 | 0 | 0 | 2,452 | 10,267 |
| 2043 | 7,761 | 54 | 0 | 0 | 2,452 | 10,267 |
| 2044 | 7,783 | 54 | 0 | 0 | 2,458 | 10,295 |
| 2045 | 7,761 | 54 | 0 | 0 | 2,452 | 10,267 |
| 2046 | 7,761 | 54 | 0 | 0 | 2,452 | 10,267 |
| 2047 | 7,761 | 54 | 0 | 0 | 2,452 | 10,267 |
| 2048 | 8,502 | 2,212 | 0 | 0 | 2,458 | 13,173 |
| 2049 | 7,761 | 54 | 0 | 0 | 2,452 | 10,267 |
| 2050 | 9,380 | 4,911 | 0 | 0 | 2,452 | 16,742 |
| 2051 | 9,380 | 4,911 | 0 | 0 | 2,452 | 16,742 |
| 2052 | 9,401 | 4,911 | 0 | 0 | 2,458 | 16,770 |
| 2053 | 9,380 | 4,911 | 0 | 0 | 2,452 | 16,742 |
| 2054 | 9,380 | 4,911 | 0 | 0 | 2,452 | 16,742 |
| 2055 | 9,380 | 4,911 | 0 | 0 | 2,452 | 16,742 |
| 2056 | 9,401 | 4,911 | 0 | 0 | 2,458 | 16,770 |
| 2057 | 9,380 | 4,911 | 0 | 0 | 2,452 | 16,742 |
| 2058 | 16,568 | 26,474 | 0 | 0 | 2,452 | 45,494 |
| 2059 | 9,380 | 4,911 | 0 | 0 | 2,452 | 16,742 |

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TABLE 3.3 (continued)
SCENARIO 3: DECON WITH 100 YEAR DFS
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|------|--------|--------------------------|--------|--------|-------|---------|
| 2060 | 9,401 | 4,911 | 0 | 0 | 2,458 | 16,770 |
| 2061 | 9,380 | 4,911 | 0 | 0 | 2,452 | 16,742 |
| 2062 | 9,380 | 4,911 | 0 | 0 | 2,452 | 16,742 |
| 2063 | 12,974 | 15,692 | 0 | 0 | 2,452 | 31,118 |
| 2064 | 9,401 | 4,911 | 0 | 0 | 2,458 | 16,770 |
| 2065 | 9,380 | 4,911 | 0 | 0 | 2,452 | 16,742 |
| 2066 | 10,099 | 7,067 | 0 | 0 | 2,452 | 19,617 |
| 2067 | 9,380 | 4,911 | 0 | 0 | 2,452 | 16,742 |
| 2068 | 19,464 | 35,099 | 0 | 0 | 2,458 | 57,022 |
| 2069 | 9,380 | 4,911 | 0 | 0 | 2,452 | 16,742 |
| 2070 | 9,380 | 4,911 | 0 | 0 | 2,452 | 16,742 |
| 2071 | 9,380 | 4,911 | 0 | 0 | 2,452 | 16,742 |
| 2072 | 9,401 | 4,911 | 0 | 0 | 2,458 | 16,770 |
| 2073 | 9,380 | 4,911 | 0 | 0 | 2,452 | 16,742 |
| 2074 | 9,380 | 4,911 | 0 | 0 | 2,452 | 16,742 |
| 2075 | 9,380 | 4,911 | 0 | 0 | 2,452 | 16,742 |
| 2076 | 9,401 | 4,911 | 0 | 0 | 2,458 | 16,770 |
| 2077 | 9,380 | 4,911 | 0 | 0 | 2,452 | 16,742 |
| 2078 | 9,380 | 4,911 | 0 | 0 | 2,452 | 16,742 |
| 2079 | 9,380 | 4,911 | 0 | 0 | 2,452 | 16,742 |
| 2080 | 9,401 | 4,911 | 0 | 0 | 2,458 | 16,770 |
| 2081 | 9,380 | 4,911 | 0 | 0 | 2,452 | 16,742 |
| 2082 | 9,380 | 4,911 | 0 | 0 | 2,452 | 16,742 |
| 2083 | 9,380 | 4,911 | 0 | 0 | 2,452 | 16,742 |
| 2084 | 34,559 | 80,383 | 0 | 0 | 2,458 | 117,400 |
| 2085 | 9,380 | 4,911 | 0 | 0 | 2,452 | 16,742 |
| 2086 | 9,380 | 4,911 | 0 | 0 | 2,452 | 16,742 |
| 2087 | 9,380 | 4,911 | 0 | 0 | 2,452 | 16,742 |
| 2088 | 10,121 | 7,069 | 0 | 0 | 2,458 | 19,648 |
| 2089 | 9,380 | 4,911 | 0 | 0 | 2,452 | 16,742 |

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TABLE 3.3 (continued)
SCENARIO 3: DECON WITH 100 YEAR DFS
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|------|--------|--------------------------|--------|--------|-------|--------|
| 2090 | 9,380 | 4,911 | 0 | 0 | 2,452 | 16,742 |
| 2091 | 9,380 | 4,911 | 0 | 0 | 2,452 | 16,742 |
| 2092 | 10,121 | 7,070 | 0 | 0 | 2,458 | 19,650 |
| 2093 | 10,640 | 8,690 | 0 | 0 | 2,452 | 21,782 |
| 2094 | 9,560 | 5,450 | 0 | 0 | 2,452 | 17,462 |
| 2095 | 10,460 | 8,150 | 0 | 0 | 2,452 | 21,062 |
| 2096 | 10,841 | 9,230 | 0 | 0 | 2,458 | 22,529 |
| 2097 | 7,743 | 0 | 0 | 0 | 2,452 | 10,195 |
| 2098 | 7,743 | 0 | 0 | 0 | 2,452 | 10,195 |
| 2099 | 7,743 | 0 | 0 | 0 | 2,452 | 10,195 |
| 2100 | 7,743 | 0 | 0 | 0 | 2,452 | 10,195 |
| 2101 | 7,743 | 0 | 0 | 0 | 2,452 | 10,195 |
| 2102 | 7,743 | 0 | 0 | 0 | 2,452 | 10,195 |
| 2103 | 7,743 | 0 | 0 | 0 | 2,452 | 10,195 |
| 2104 | 7,765 | 0 | 0 | 0 | 2,458 | 10,223 |
| 2105 | 7,743 | 0 | 0 | 0 | 2,452 | 10,195 |
| 2106 | 7,743 | 0 | 0 | 0 | 2,452 | 10,195 |
| 2107 | 7,743 | 0 | 0 | 0 | 2,452 | 10,195 |
| 2108 | 14,952 | 21,564 | 0 | 0 | 2,458 | 38,974 |
| 2109 | 7,743 | 0 | 0 | 0 | 2,452 | 10,195 |
| 2110 | 7,743 | 0 | 0 | 0 | 2,452 | 10,195 |
| 2111 | 7,743 | 0 | 0 | 0 | 2,452 | 10,195 |
| 2112 | 7,765 | 0 | 0 | 0 | 2,458 | 10,223 |
| 2113 | 11,337 | 10,782 | 0 | 0 | 2,452 | 24,571 |
| 2114 | 7,743 | 0 | 0 | 0 | 2,452 | 10,195 |
| 2115 | 7,743 | 0 | 0 | 0 | 2,452 | 10,195 |
| 2116 | 8,483 | 2,156 | 0 | 0 | 2,458 | 13,098 |
| 2117 | 7,743 | 0 | 0 | 0 | 2,452 | 10,195 |
| 2118 | 18,325 | 31,746 | 0 | 0 | 2,452 | 52,523 |
| 2119 | 8,366 | 1,868 | 0 | 0 | 2,452 | 12,686 |

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TABLE 3.3 (continued)
SCENARIO 3: DECON WITH 100 YEAR DFS
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|--------------|------------------|--------------------------|---------------|----------------|----------------|------------------|
| 2120 | 8,284 | 1,557 | 0 | 0 | 2,458 | 12,299 |
| 2121 | 8,262 | 1,557 | 0 | 0 | 2,452 | 12,271 |
| 2122 | 8,262 | 1,557 | 0 | 0 | 2,452 | 12,271 |
| 2123 | 8,366 | 1,868 | 0 | 0 | 2,452 | 12,686 |
| 2124 | 8,284 | 1,557 | 0 | 0 | 2,458 | 12,299 |
| 2125 | 8,262 | 1,557 | 0 | 0 | 2,452 | 12,271 |
| 2126 | 8,262 | 1,557 | 0 | 0 | 2,452 | 12,271 |
| 2127 | 8,366 | 1,868 | 0 | 0 | 2,452 | 12,686 |
| 2128 | 9,003 | 3,715 | 0 | 0 | 2,458 | 15,177 |
| 2129 | 8,262 | 1,557 | 0 | 0 | 2,452 | 12,271 |
| 2130 | 7,898 | 1,977 | 0 | 0 | 7,406 | 17,281 |
| 2131 | 1,935 | 1,241 | 22 | 354 | 3,617 | 7,168 |
| | | | | | | |
| Total | 1,386,633 | 706,414 | 10,030 | 166,633 | 376,162 | 2,645,871 |

Note: Columns may not add due to rounding

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**TABLE 3.4
SCENARIO 4: DECON WITH 200 YEAR DFS
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)**

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|------|--------|--------------------------|--------|--------|--------|---------|
| 2030 | 22,676 | 1,092 | 658 | 20 | 7,605 | 32,050 |
| 2031 | 77,872 | 9,912 | 2,747 | 1,362 | 34,052 | 125,946 |
| 2032 | 87,239 | 42,568 | 2,393 | 59,659 | 32,197 | 224,056 |
| 2033 | 97,170 | 69,747 | 1,830 | 56,740 | 27,821 | 253,308 |
| 2034 | 97,350 | 77,212 | 1,336 | 29,642 | 22,782 | 228,322 |
| 2035 | 52,998 | 4,394 | 601 | 11,794 | 5,834 | 75,620 |
| 2036 | 37,468 | 10,398 | 250 | 3,307 | 4,603 | 56,026 |
| 2037 | 32,364 | 11,447 | 193 | 3,754 | 4,558 | 52,316 |
| 2038 | 7,761 | 54 | 0 | 0 | 2,442 | 10,258 |
| 2039 | 7,761 | 54 | 0 | 0 | 2,442 | 10,258 |
| 2040 | 7,783 | 54 | 0 | 0 | 2,449 | 10,286 |
| 2041 | 7,761 | 54 | 0 | 0 | 2,442 | 10,258 |
| 2042 | 7,761 | 54 | 0 | 0 | 2,442 | 10,258 |
| 2043 | 7,761 | 54 | 0 | 0 | 2,442 | 10,258 |
| 2044 | 7,783 | 54 | 0 | 0 | 2,449 | 10,286 |
| 2045 | 7,761 | 54 | 0 | 0 | 2,442 | 10,258 |
| 2046 | 7,761 | 54 | 0 | 0 | 2,442 | 10,258 |
| 2047 | 7,761 | 54 | 0 | 0 | 2,442 | 10,258 |
| 2048 | 8,502 | 2,212 | 0 | 0 | 2,449 | 13,163 |
| 2049 | 7,761 | 54 | 0 | 0 | 2,442 | 10,258 |
| 2050 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2051 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2052 | 9,401 | 4,911 | 0 | 0 | 2,449 | 16,761 |
| 2053 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2054 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2055 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2056 | 9,401 | 4,911 | 0 | 0 | 2,449 | 16,761 |
| 2057 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2058 | 16,568 | 26,474 | 0 | 0 | 2,442 | 45,484 |
| 2059 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |

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TABLE 3.4 (continued)
SCENARIO 4: DECON WITH 200 YEAR DFS
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|------|--------|--------------------------|--------|--------|-------|---------|
| 2060 | 9,401 | 4,911 | 0 | 0 | 2,449 | 16,761 |
| 2061 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2062 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2063 | 12,974 | 15,692 | 0 | 0 | 2,442 | 31,109 |
| 2064 | 9,401 | 4,911 | 0 | 0 | 2,449 | 16,761 |
| 2065 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2066 | 10,099 | 7,067 | 0 | 0 | 2,442 | 19,608 |
| 2067 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2068 | 19,464 | 35,099 | 0 | 0 | 2,449 | 57,013 |
| 2069 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2070 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2071 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2072 | 9,401 | 4,911 | 0 | 0 | 2,449 | 16,761 |
| 2073 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2074 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2075 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2076 | 9,401 | 4,911 | 0 | 0 | 2,449 | 16,761 |
| 2077 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2078 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2079 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2080 | 9,401 | 4,911 | 0 | 0 | 2,449 | 16,761 |
| 2081 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2082 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2083 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2084 | 34,559 | 80,383 | 0 | 0 | 2,449 | 117,391 |
| 2085 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2086 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2087 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2088 | 10,121 | 7,069 | 0 | 0 | 2,449 | 19,639 |
| 2089 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |

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TABLE 3.4 (continued)
SCENARIO 4: DECON WITH 200 YEAR DFS
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|------|--------|--------------------------|--------|--------|-------|--------|
| 2090 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2091 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2092 | 9,401 | 4,911 | 0 | 0 | 2,449 | 16,761 |
| 2093 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2094 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2095 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2096 | 9,401 | 4,911 | 0 | 0 | 2,449 | 16,761 |
| 2097 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2098 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2099 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2100 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2101 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2102 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2103 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2104 | 9,401 | 4,911 | 0 | 0 | 2,449 | 16,761 |
| 2105 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2106 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2107 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2108 | 16,589 | 26,474 | 0 | 0 | 2,449 | 45,512 |
| 2109 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2110 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2111 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2112 | 9,401 | 4,911 | 0 | 0 | 2,449 | 16,761 |
| 2113 | 12,974 | 15,692 | 0 | 0 | 2,442 | 31,109 |
| 2114 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2115 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2116 | 10,120 | 7,067 | 0 | 0 | 2,449 | 19,636 |
| 2117 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2118 | 19,443 | 35,099 | 0 | 0 | 2,442 | 56,985 |
| 2119 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |

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TABLE 3.4 (continued)
SCENARIO 4: DECON WITH 200 YEAR DFS
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|------|--------|--------------------------|--------|--------|-------|---------|
| 2120 | 9,401 | 4,911 | 0 | 0 | 2,449 | 16,761 |
| 2121 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2122 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2123 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2124 | 9,401 | 4,911 | 0 | 0 | 2,449 | 16,761 |
| 2125 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2126 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2127 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2128 | 10,121 | 7,069 | 0 | 0 | 2,449 | 19,639 |
| 2129 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2130 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2131 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2132 | 9,401 | 4,911 | 0 | 0 | 2,449 | 16,761 |
| 2133 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2134 | 34,538 | 80,383 | 0 | 0 | 2,442 | 117,363 |
| 2135 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2136 | 9,401 | 4,911 | 0 | 0 | 2,449 | 16,761 |
| 2137 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2138 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2139 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2140 | 9,401 | 4,911 | 0 | 0 | 2,449 | 16,761 |
| 2141 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2142 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2143 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2144 | 9,401 | 4,911 | 0 | 0 | 2,449 | 16,761 |
| 2145 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2146 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2147 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2148 | 9,401 | 4,911 | 0 | 0 | 2,449 | 16,761 |
| 2149 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |

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TABLE 3.4 (continued)
SCENARIO 4: DECON WITH 200 YEAR DFS
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|------|--------|--------------------------|--------|--------|-------|--------|
| 2150 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2151 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2152 | 9,401 | 4,911 | 0 | 0 | 2,449 | 16,761 |
| 2153 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2154 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2155 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2156 | 9,401 | 4,911 | 0 | 0 | 2,449 | 16,761 |
| 2157 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2158 | 16,568 | 26,474 | 0 | 0 | 2,442 | 45,484 |
| 2159 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2160 | 9,401 | 4,911 | 0 | 0 | 2,449 | 16,761 |
| 2161 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2162 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2163 | 12,974 | 15,692 | 0 | 0 | 2,442 | 31,109 |
| 2164 | 9,401 | 4,911 | 0 | 0 | 2,449 | 16,761 |
| 2165 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2166 | 10,099 | 7,067 | 0 | 0 | 2,442 | 19,608 |
| 2167 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2168 | 20,184 | 37,258 | 0 | 0 | 2,449 | 59,891 |
| 2169 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2170 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2171 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2172 | 9,401 | 4,911 | 0 | 0 | 2,449 | 16,761 |
| 2173 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2174 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2175 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2176 | 9,401 | 4,911 | 0 | 0 | 2,449 | 16,761 |
| 2177 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2178 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2179 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |

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TABLE 3.4 (continued)
SCENARIO 4: DECON WITH 200 YEAR DFS
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|------|--------|--------------------------|--------|--------|-------|---------|
| 2180 | 9,401 | 4,911 | 0 | 0 | 2,449 | 16,761 |
| 2181 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2182 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2183 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2184 | 34,559 | 80,383 | 0 | 0 | 2,449 | 117,391 |
| 2185 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2186 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2187 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2188 | 9,401 | 4,911 | 0 | 0 | 2,449 | 16,761 |
| 2189 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2190 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2191 | 9,380 | 4,911 | 0 | 0 | 2,442 | 16,733 |
| 2192 | 10,121 | 7,070 | 0 | 0 | 2,449 | 19,641 |
| 2193 | 10,640 | 8,690 | 0 | 0 | 2,442 | 21,772 |
| 2194 | 9,560 | 5,450 | 0 | 0 | 2,442 | 17,453 |
| 2195 | 10,460 | 8,150 | 0 | 0 | 2,442 | 21,052 |
| 2196 | 10,841 | 9,230 | 0 | 0 | 2,449 | 22,520 |
| 2197 | 7,743 | 0 | 0 | 0 | 2,442 | 10,186 |
| 2198 | 7,743 | 0 | 0 | 0 | 2,442 | 10,186 |
| 2199 | 7,743 | 0 | 0 | 0 | 2,442 | 10,186 |
| 2200 | 7,743 | 0 | 0 | 0 | 2,442 | 10,186 |
| 2201 | 7,743 | 0 | 0 | 0 | 2,442 | 10,186 |
| 2202 | 7,743 | 0 | 0 | 0 | 2,442 | 10,186 |
| 2203 | 7,743 | 0 | 0 | 0 | 2,442 | 10,186 |
| 2204 | 7,765 | 0 | 0 | 0 | 2,449 | 10,214 |
| 2205 | 7,743 | 0 | 0 | 0 | 2,442 | 10,186 |
| 2206 | 7,743 | 0 | 0 | 0 | 2,442 | 10,186 |
| 2207 | 7,743 | 0 | 0 | 0 | 2,442 | 10,186 |
| 2208 | 15,672 | 23,722 | 0 | 0 | 2,449 | 41,843 |
| 2209 | 7,743 | 0 | 0 | 0 | 2,442 | 10,186 |

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TABLE 3.4 (continued)
SCENARIO 4: DECON WITH 200 YEAR DFS
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|--------------|------------------|--------------------------|---------------|----------------|----------------|------------------|
| 2210 | 7,743 | 0 | 0 | 0 | 2,442 | 10,186 |
| 2211 | 7,743 | 0 | 0 | 0 | 2,442 | 10,186 |
| 2212 | 7,765 | 0 | 0 | 0 | 2,449 | 10,214 |
| 2213 | 11,337 | 10,782 | 0 | 0 | 2,442 | 24,561 |
| 2214 | 7,743 | 0 | 0 | 0 | 2,442 | 10,186 |
| 2215 | 7,743 | 0 | 0 | 0 | 2,442 | 10,186 |
| 2216 | 8,483 | 2,156 | 0 | 0 | 2,449 | 13,089 |
| 2217 | 7,743 | 0 | 0 | 0 | 2,442 | 10,186 |
| 2218 | 18,325 | 31,746 | 0 | 0 | 2,442 | 52,513 |
| 2219 | 8,366 | 1,868 | 0 | 0 | 2,442 | 12,677 |
| 2220 | 8,283 | 1,557 | 0 | 0 | 2,449 | 12,289 |
| 2221 | 8,262 | 1,557 | 0 | 0 | 2,442 | 12,261 |
| 2222 | 8,262 | 1,557 | 0 | 0 | 2,442 | 12,261 |
| 2223 | 8,366 | 1,868 | 0 | 0 | 2,442 | 12,677 |
| 2224 | 8,283 | 1,557 | 0 | 0 | 2,449 | 12,289 |
| 2225 | 8,262 | 1,557 | 0 | 0 | 2,442 | 12,261 |
| 2226 | 8,262 | 1,557 | 0 | 0 | 2,442 | 12,261 |
| 2227 | 8,366 | 1,868 | 0 | 0 | 2,442 | 12,677 |
| 2228 | 8,283 | 1,557 | 0 | 0 | 2,449 | 12,289 |
| 2229 | 8,262 | 1,557 | 0 | 0 | 2,442 | 12,261 |
| 2230 | 7,898 | 1,976 | 0 | 0 | 7,397 | 17,272 |
| 2231 | 1,935 | 1,241 | 22 | 354 | 3,617 | 7,168 |
| | | | | | | |
| Total | 2,420,040 | 1,482,106 | 10,030 | 166,633 | 619,701 | 4,698,508 |

Note: Columns may not add due to rounding

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TABLE 3.5
SCENARIO 5: SAFSTOR WITH 42 YEAR DFS
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|------|--------|--------------------------|--------|--------|--------|---------|
| 2030 | 18,693 | 912 | 658 | 20 | 7,520 | 27,803 |
| 2031 | 68,993 | 7,737 | 2,089 | 987 | 39,899 | 119,705 |
| 2032 | 44,420 | 38,443 | 726 | 430 | 22,956 | 106,975 |
| 2033 | 41,096 | 45,594 | 418 | 24 | 22,409 | 109,540 |
| 2034 | 31,070 | 31,336 | 352 | 20 | 17,048 | 79,827 |
| 2035 | 9,293 | 395 | 209 | 11 | 5,394 | 15,303 |
| 2036 | 10,038 | 2,556 | 209 | 11 | 5,409 | 18,224 |
| 2037 | 10,373 | 3,635 | 209 | 11 | 5,394 | 19,623 |
| 2038 | 9,473 | 935 | 209 | 11 | 5,394 | 16,023 |
| 2039 | 10,373 | 3,635 | 209 | 11 | 5,394 | 19,623 |
| 2040 | 10,758 | 4,716 | 209 | 11 | 5,409 | 21,104 |
| 2041 | 9,275 | 341 | 209 | 11 | 5,394 | 15,231 |
| 2042 | 9,275 | 341 | 209 | 11 | 5,394 | 15,231 |
| 2043 | 9,275 | 341 | 209 | 11 | 5,394 | 15,231 |
| 2044 | 9,301 | 342 | 209 | 11 | 5,409 | 15,273 |
| 2045 | 9,275 | 341 | 209 | 11 | 5,394 | 15,231 |
| 2046 | 9,275 | 341 | 209 | 11 | 5,394 | 15,231 |
| 2047 | 9,275 | 341 | 209 | 11 | 5,394 | 15,231 |
| 2048 | 10,020 | 2,501 | 209 | 11 | 5,409 | 18,151 |
| 2049 | 9,275 | 341 | 209 | 11 | 5,394 | 15,231 |
| 2050 | 9,275 | 341 | 209 | 11 | 5,394 | 15,231 |
| 2051 | 9,275 | 341 | 209 | 11 | 5,394 | 15,231 |
| 2052 | 9,404 | 654 | 209 | 11 | 5,409 | 15,688 |
| 2053 | 9,586 | 1,275 | 209 | 11 | 5,394 | 16,477 |
| 2054 | 9,483 | 964 | 209 | 11 | 5,394 | 16,062 |
| 2055 | 9,483 | 964 | 209 | 11 | 5,394 | 16,062 |
| 2056 | 9,923 | 2,210 | 209 | 11 | 5,409 | 17,764 |
| 2057 | 9,794 | 1,898 | 209 | 11 | 5,394 | 17,307 |
| 2058 | 9,794 | 1,898 | 209 | 11 | 5,394 | 17,307 |
| 2059 | 9,794 | 1,898 | 209 | 11 | 5,394 | 17,307 |

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TABLE 3.5 (continued)
SCENARIO 5: SAFSTOR WITH 42 YEAR DFS
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|------|--------|--------------------------|--------|--------|--------|---------|
| 2060 | 9,612 | 1,276 | 209 | 11 | 5,409 | 16,518 |
| 2061 | 9,483 | 964 | 209 | 11 | 5,394 | 16,062 |
| 2062 | 9,586 | 1,275 | 209 | 11 | 5,394 | 16,477 |
| 2063 | 9,483 | 964 | 209 | 11 | 5,394 | 16,062 |
| 2064 | 9,508 | 965 | 209 | 11 | 5,409 | 16,103 |
| 2065 | 9,586 | 1,275 | 209 | 11 | 5,394 | 16,477 |
| 2066 | 9,483 | 964 | 209 | 11 | 5,394 | 16,062 |
| 2067 | 9,483 | 964 | 209 | 11 | 5,394 | 16,062 |
| 2068 | 9,612 | 1,276 | 209 | 11 | 5,409 | 16,518 |
| 2069 | 9,690 | 1,587 | 209 | 11 | 5,394 | 16,892 |
| 2070 | 9,483 | 964 | 209 | 11 | 5,394 | 16,062 |
| 2071 | 9,690 | 1,587 | 209 | 11 | 5,394 | 16,892 |
| 2072 | 9,716 | 1,588 | 209 | 11 | 5,409 | 16,934 |
| 2073 | 4,425 | 332 | 209 | 10 | 4,159 | 9,136 |
| 2074 | 4,425 | 332 | 209 | 10 | 4,159 | 9,136 |
| 2075 | 4,425 | 332 | 209 | 10 | 4,159 | 9,136 |
| 2076 | 4,437 | 333 | 209 | 11 | 4,171 | 9,161 |
| 2077 | 4,425 | 332 | 209 | 10 | 4,159 | 9,136 |
| 2078 | 4,425 | 332 | 209 | 10 | 4,159 | 9,136 |
| 2079 | 4,425 | 332 | 209 | 10 | 4,159 | 9,136 |
| 2080 | 4,437 | 333 | 209 | 11 | 4,171 | 9,161 |
| 2081 | 4,425 | 332 | 209 | 10 | 4,159 | 9,136 |
| 2082 | 4,425 | 332 | 209 | 10 | 4,159 | 9,136 |
| 2083 | 4,425 | 332 | 209 | 10 | 4,159 | 9,136 |
| 2084 | 4,437 | 333 | 209 | 11 | 4,171 | 9,161 |
| 2085 | 37,435 | 4,080 | 1,574 | 53 | 4,212 | 47,355 |
| 2086 | 54,409 | 12,607 | 2,065 | 18,514 | 6,705 | 94,300 |
| 2087 | 63,936 | 31,146 | 1,941 | 75,384 | 14,548 | 186,956 |
| 2088 | 56,511 | 9,540 | 1,571 | 25,387 | 10,427 | 103,436 |
| 2089 | 54,852 | 8,981 | 1,488 | 23,587 | 9,919 | 98,827 |

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TABLE 3.5 (continued)
SCENARIO 5: SAFSTOR WITH 42 YEAR DFS
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|--------------|----------------|--------------------------|---------------|----------------|----------------|------------------|
| 2090 | 29,405 | 5,226 | 352 | 33 | 3,584 | 38,600 |
| 2091 | 18,561 | 12,810 | 209 | 0 | 4,002 | 35,582 |
| 2092 | 7,781 | 5,370 | 88 | 0 | 1,678 | 14,915 |
| | | | | | | |
| Total | 945,084 | 266,972 | 23,983 | 144,997 | 419,993 | 1,801,028 |

Note: Columns may not add due to rounding

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TABLE 3.6
SCENARIO 6: SAFSTOR WITH 60 YEAR DFS
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|------|--------|--------------------------|--------|--------|--------|---------|
| 2030 | 18,693 | 912 | 658 | 20 | 7,520 | 27,803 |
| 2031 | 68,993 | 7,737 | 2,089 | 987 | 39,899 | 119,705 |
| 2032 | 44,420 | 38,443 | 726 | 430 | 22,956 | 106,975 |
| 2033 | 41,096 | 45,594 | 418 | 24 | 22,409 | 109,540 |
| 2034 | 31,070 | 31,336 | 352 | 20 | 17,048 | 79,827 |
| 2035 | 9,293 | 395 | 209 | 11 | 5,394 | 15,303 |
| 2036 | 9,319 | 396 | 209 | 11 | 5,409 | 15,345 |
| 2037 | 9,293 | 395 | 209 | 11 | 5,394 | 15,303 |
| 2038 | 9,293 | 395 | 209 | 11 | 5,394 | 15,303 |
| 2039 | 9,293 | 395 | 209 | 11 | 5,394 | 15,303 |
| 2040 | 9,319 | 396 | 209 | 11 | 5,409 | 15,345 |
| 2041 | 9,293 | 395 | 209 | 11 | 5,394 | 15,303 |
| 2042 | 9,293 | 395 | 209 | 11 | 5,394 | 15,303 |
| 2043 | 9,293 | 395 | 209 | 11 | 5,394 | 15,303 |
| 2044 | 9,319 | 396 | 209 | 11 | 5,409 | 15,345 |
| 2045 | 9,293 | 395 | 209 | 11 | 5,394 | 15,303 |
| 2046 | 9,293 | 395 | 209 | 11 | 5,394 | 15,303 |
| 2047 | 9,293 | 395 | 209 | 11 | 5,394 | 15,303 |
| 2048 | 10,038 | 2,555 | 209 | 11 | 5,409 | 18,223 |
| 2049 | 9,293 | 395 | 209 | 11 | 5,394 | 15,303 |
| 2050 | 10,912 | 5,252 | 209 | 11 | 5,394 | 21,779 |
| 2051 | 10,912 | 5,252 | 209 | 11 | 5,394 | 21,779 |
| 2052 | 11,657 | 7,412 | 209 | 11 | 5,409 | 24,700 |
| 2053 | 12,172 | 9,031 | 209 | 11 | 5,394 | 26,818 |
| 2054 | 11,092 | 5,792 | 209 | 11 | 5,394 | 22,498 |
| 2055 | 11,992 | 8,491 | 209 | 11 | 5,394 | 26,098 |
| 2056 | 12,377 | 9,572 | 209 | 11 | 5,409 | 27,580 |
| 2057 | 9,275 | 341 | 209 | 11 | 5,394 | 15,231 |
| 2058 | 9,275 | 341 | 209 | 11 | 5,394 | 15,231 |
| 2059 | 9,275 | 341 | 209 | 11 | 5,394 | 15,231 |

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TABLE 3.6 (continued)
SCENARIO 6: SAFSTOR WITH 60 YEAR DFS
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|------|--------|--------------------------|--------|--------|--------|---------|
| 2060 | 9,301 | 342 | 209 | 11 | 5,409 | 15,273 |
| 2061 | 9,275 | 341 | 209 | 11 | 5,394 | 15,231 |
| 2062 | 9,275 | 341 | 209 | 11 | 5,394 | 15,231 |
| 2063 | 9,275 | 341 | 209 | 11 | 5,394 | 15,231 |
| 2064 | 9,301 | 342 | 209 | 11 | 5,409 | 15,273 |
| 2065 | 9,275 | 341 | 209 | 11 | 5,394 | 15,231 |
| 2066 | 9,275 | 341 | 209 | 11 | 5,394 | 15,231 |
| 2067 | 9,275 | 341 | 209 | 11 | 5,394 | 15,231 |
| 2068 | 9,301 | 342 | 209 | 11 | 5,409 | 15,273 |
| 2069 | 9,275 | 341 | 209 | 11 | 5,394 | 15,231 |
| 2070 | 9,275 | 341 | 209 | 11 | 5,394 | 15,231 |
| 2071 | 9,275 | 341 | 209 | 11 | 5,394 | 15,231 |
| 2072 | 9,301 | 342 | 209 | 11 | 5,409 | 15,273 |
| 2073 | 9,275 | 341 | 209 | 11 | 5,394 | 15,231 |
| 2074 | 9,275 | 341 | 209 | 11 | 5,394 | 15,231 |
| 2075 | 9,275 | 341 | 209 | 11 | 5,394 | 15,231 |
| 2076 | 9,301 | 342 | 209 | 11 | 5,409 | 15,273 |
| 2077 | 9,275 | 341 | 209 | 11 | 5,394 | 15,231 |
| 2078 | 9,794 | 1,898 | 209 | 11 | 5,394 | 17,307 |
| 2079 | 9,898 | 2,210 | 209 | 11 | 5,394 | 17,722 |
| 2080 | 9,819 | 1,899 | 209 | 11 | 5,409 | 17,349 |
| 2081 | 9,794 | 1,898 | 209 | 11 | 5,394 | 17,307 |
| 2082 | 9,794 | 1,898 | 209 | 11 | 5,394 | 17,307 |
| 2083 | 9,898 | 2,210 | 209 | 11 | 5,394 | 17,722 |
| 2084 | 9,819 | 1,899 | 209 | 11 | 5,409 | 17,349 |
| 2085 | 39,677 | 5,640 | 1,574 | 54 | 5,430 | 52,374 |
| 2086 | 55,815 | 14,221 | 2,065 | 18,514 | 7,675 | 98,290 |
| 2087 | 66,537 | 33,022 | 1,941 | 75,006 | 15,165 | 191,672 |
| 2088 | 59,340 | 12,021 | 1,571 | 21,744 | 8,784 | 103,459 |
| 2089 | 57,778 | 11,382 | 1,488 | 20,876 | 8,972 | 100,495 |

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TABLE 3.6 (continued)
SCENARIO 6: SAFSTOR WITH 60 YEAR DFS
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|--------------|------------------|--------------------------|---------------|----------------|----------------|------------------|
| 2090 | 32,388 | 6,183 | 352 | 6,766 | 9,424 | 55,113 |
| 2091 | 18,561 | 12,810 | 209 | 0 | 4,138 | 35,719 |
| 2092 | 7,781 | 5,370 | 88 | 0 | 1,735 | 14,972 |
| | | | | | | |
| Total | 1,027,203 | 304,650 | 23,983 | 145,009 | 441,071 | 1,941,915 |

Note: Columns may not add due to rounding

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TABLE 3.7
SCENARIO 7: SAFSTOR WITH 100 YEAR DFS
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|------|--------|--------------------------|--------|--------|--------|---------|
| 2030 | 19,195 | 1,230 | 658 | 20 | 7,520 | 28,622 |
| 2031 | 69,384 | 7,388 | 2,089 | 982 | 39,899 | 119,742 |
| 2032 | 35,973 | 13,099 | 726 | 430 | 22,956 | 73,184 |
| 2033 | 32,005 | 18,323 | 418 | 24 | 22,409 | 73,179 |
| 2034 | 52,289 | 94,992 | 352 | 20 | 17,048 | 164,701 |
| 2035 | 9,293 | 395 | 209 | 11 | 5,394 | 15,303 |
| 2036 | 9,319 | 396 | 209 | 11 | 5,409 | 15,345 |
| 2037 | 9,293 | 395 | 209 | 11 | 5,394 | 15,303 |
| 2038 | 9,293 | 395 | 209 | 11 | 5,394 | 15,303 |
| 2039 | 9,293 | 395 | 209 | 11 | 5,394 | 15,303 |
| 2040 | 9,319 | 396 | 209 | 11 | 5,409 | 15,345 |
| 2041 | 9,293 | 395 | 209 | 11 | 5,394 | 15,303 |
| 2042 | 9,293 | 395 | 209 | 11 | 5,394 | 15,303 |
| 2043 | 9,293 | 395 | 209 | 11 | 5,394 | 15,303 |
| 2044 | 9,319 | 396 | 209 | 11 | 5,409 | 15,345 |
| 2045 | 9,293 | 395 | 209 | 11 | 5,394 | 15,303 |
| 2046 | 9,293 | 395 | 209 | 11 | 5,394 | 15,303 |
| 2047 | 9,293 | 395 | 209 | 11 | 5,394 | 15,303 |
| 2048 | 10,038 | 2,555 | 209 | 11 | 5,409 | 18,223 |
| 2049 | 9,293 | 395 | 209 | 11 | 5,394 | 15,303 |
| 2050 | 10,912 | 5,252 | 209 | 11 | 5,394 | 21,779 |
| 2051 | 10,912 | 5,252 | 209 | 11 | 5,394 | 21,779 |
| 2052 | 10,937 | 5,253 | 209 | 11 | 5,409 | 21,820 |
| 2053 | 10,912 | 5,252 | 209 | 11 | 5,394 | 21,779 |
| 2054 | 10,912 | 5,252 | 209 | 11 | 5,394 | 21,779 |
| 2055 | 10,912 | 5,252 | 209 | 11 | 5,394 | 21,779 |
| 2056 | 10,937 | 5,253 | 209 | 11 | 5,409 | 21,820 |
| 2057 | 10,912 | 5,252 | 209 | 11 | 5,394 | 21,779 |
| 2058 | 18,100 | 26,815 | 209 | 11 | 5,394 | 50,530 |
| 2059 | 10,912 | 5,252 | 209 | 11 | 5,394 | 21,779 |

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TABLE 3.7 (continued)
SCENARIO 7: SAFSTOR WITH 100 YEAR DFS
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|------|--------|--------------------------|--------|--------|--------|---------|
| 2060 | 10,937 | 5,253 | 209 | 11 | 5,409 | 21,820 |
| 2061 | 10,912 | 5,252 | 209 | 11 | 5,394 | 21,779 |
| 2062 | 10,912 | 5,252 | 209 | 11 | 5,394 | 21,779 |
| 2063 | 14,506 | 16,034 | 209 | 11 | 5,394 | 36,154 |
| 2064 | 10,937 | 5,253 | 209 | 11 | 5,409 | 21,820 |
| 2065 | 10,912 | 5,252 | 209 | 11 | 5,394 | 21,779 |
| 2066 | 11,631 | 7,408 | 209 | 11 | 5,394 | 24,654 |
| 2067 | 10,912 | 5,252 | 209 | 11 | 5,394 | 21,779 |
| 2068 | 21,000 | 35,442 | 209 | 11 | 5,409 | 62,072 |
| 2069 | 10,912 | 5,252 | 209 | 11 | 5,394 | 21,779 |
| 2070 | 10,912 | 5,252 | 209 | 11 | 5,394 | 21,779 |
| 2071 | 10,912 | 5,252 | 209 | 11 | 5,394 | 21,779 |
| 2072 | 10,937 | 5,253 | 209 | 11 | 5,409 | 21,820 |
| 2073 | 10,912 | 5,252 | 209 | 11 | 5,394 | 21,779 |
| 2074 | 10,912 | 5,252 | 209 | 11 | 5,394 | 21,779 |
| 2075 | 10,912 | 5,252 | 209 | 11 | 5,394 | 21,779 |
| 2076 | 10,937 | 5,253 | 209 | 11 | 5,409 | 21,820 |
| 2077 | 10,912 | 5,252 | 209 | 11 | 5,394 | 21,779 |
| 2078 | 10,912 | 5,252 | 209 | 11 | 5,394 | 21,779 |
| 2079 | 10,912 | 5,252 | 209 | 11 | 5,394 | 21,779 |
| 2080 | 10,937 | 5,253 | 209 | 11 | 5,409 | 21,820 |
| 2081 | 10,912 | 5,252 | 209 | 11 | 5,394 | 21,779 |
| 2082 | 10,912 | 5,252 | 209 | 11 | 5,394 | 21,779 |
| 2083 | 10,912 | 5,252 | 209 | 11 | 5,394 | 21,779 |
| 2084 | 36,095 | 80,725 | 209 | 11 | 5,409 | 122,450 |
| 2085 | 39,882 | 8,994 | 1,574 | 54 | 5,471 | 55,974 |
| 2086 | 56,570 | 18,301 | 2,065 | 18,514 | 6,727 | 102,177 |
| 2087 | 67,544 | 39,125 | 1,941 | 75,006 | 11,266 | 194,882 |
| 2088 | 60,817 | 16,453 | 1,571 | 21,744 | 8,840 | 109,425 |
| 2089 | 58,571 | 13,747 | 1,488 | 20,202 | 8,561 | 102,570 |

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TABLE 3.7 (continued)
SCENARIO 7: SAFSTOR WITH 100 YEAR DFS
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|------|--------|--------------------------|--------|--------|-------|--------|
| 2090 | 35,101 | 9,949 | 352 | 33 | 5,111 | 50,547 |
| 2091 | 24,492 | 17,115 | 209 | 0 | 5,133 | 46,948 |
| 2092 | 16,194 | 12,186 | 88 | 0 | 3,606 | 32,074 |
| 2093 | 10,192 | 8,690 | 0 | 0 | 2,493 | 21,375 |
| 2094 | 9,112 | 5,450 | 0 | 0 | 2,493 | 17,056 |
| 2095 | 10,070 | 8,392 | 0 | 7,052 | 3,686 | 29,199 |
| 2096 | 10,392 | 9,230 | 0 | 0 | 2,500 | 22,122 |
| 2097 | 7,296 | 0 | 0 | 0 | 2,493 | 9,789 |
| 2098 | 7,296 | 0 | 0 | 0 | 2,493 | 9,789 |
| 2099 | 7,296 | 0 | 0 | 0 | 2,493 | 9,789 |
| 2100 | 7,296 | 0 | 0 | 0 | 2,493 | 9,789 |
| 2010 | 7,296 | 0 | 0 | 0 | 2,493 | 9,789 |
| 2102 | 7,296 | 0 | 0 | 0 | 2,493 | 9,789 |
| 2103 | 7,296 | 0 | 0 | 0 | 2,493 | 9,789 |
| 2104 | 7,316 | 0 | 0 | 0 | 2,500 | 9,816 |
| 2105 | 7,296 | 0 | 0 | 0 | 2,493 | 9,789 |
| 2106 | 7,296 | 0 | 0 | 0 | 2,493 | 9,789 |
| 2107 | 7,296 | 0 | 0 | 0 | 2,493 | 9,789 |
| 2108 | 14,503 | 21,564 | 0 | 0 | 2,500 | 38,567 |
| 2109 | 7,296 | 0 | 0 | 0 | 2,493 | 9,789 |
| 2110 | 7,296 | 0 | 0 | 0 | 2,493 | 9,789 |
| 2111 | 7,296 | 0 | 0 | 0 | 2,493 | 9,789 |
| 2112 | 7,316 | 0 | 0 | 0 | 2,500 | 9,816 |
| 2113 | 10,890 | 10,782 | 0 | 0 | 2,493 | 24,164 |
| 2114 | 7,296 | 0 | 0 | 0 | 2,493 | 9,789 |
| 2115 | 7,296 | 0 | 0 | 0 | 2,493 | 9,789 |
| 2116 | 8,034 | 2,156 | 0 | 0 | 2,500 | 12,691 |
| 2117 | 7,296 | 0 | 0 | 0 | 2,493 | 9,789 |
| 2118 | 17,878 | 31,746 | 0 | 0 | 2,493 | 52,116 |
| 2119 | 7,918 | 1,868 | 0 | 0 | 2,493 | 12,280 |

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TABLE 3.7 (continued)
SCENARIO 7: SAFSTOR WITH 100 YEAR DFS
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|--------------|------------------|--------------------------|---------------|----------------|----------------|------------------|
| 2120 | 7,835 | 1,557 | 0 | 0 | 2,500 | 11,891 |
| 2121 | 7,815 | 1,557 | 0 | 0 | 2,493 | 11,864 |
| 2122 | 7,815 | 1,557 | 0 | 0 | 2,493 | 11,864 |
| 2123 | 7,918 | 1,868 | 0 | 0 | 2,493 | 12,280 |
| 2124 | 7,835 | 1,557 | 0 | 0 | 2,500 | 11,891 |
| 2125 | 7,815 | 1,557 | 0 | 0 | 2,493 | 11,864 |
| 2126 | 7,815 | 1,557 | 0 | 0 | 2,493 | 11,864 |
| 2127 | 7,918 | 1,868 | 0 | 0 | 2,493 | 12,280 |
| 2128 | 8,554 | 3,715 | 0 | 0 | 2,500 | 14,769 |
| 2129 | 7,815 | 1,557 | 0 | 0 | 2,493 | 11,864 |
| 2130 | 7,451 | 1,976 | 0 | 0 | 7,446 | 16,873 |
| 2131 | 1,941 | 1,243 | 22 | 354 | 3,617 | 7,177 |
| | | | | | | |
| Total | 1,455,980 | 724,426 | 24,005 | 145,004 | 539,017 | 2,888,431 |

Note: Columns may not add due to rounding

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TABLE 3.8
SCENARIO 8: SAFSTOR WITH 200 YEAR DFS
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|------|--------|--------------------------|--------|--------|--------|---------|
| 2030 | 19,195 | 1,230 | 658 | 20 | 7,520 | 28,622 |
| 2031 | 69,384 | 7,388 | 2,089 | 982 | 39,899 | 119,742 |
| 2032 | 35,973 | 13,099 | 726 | 430 | 22,956 | 73,184 |
| 2033 | 32,005 | 18,323 | 418 | 24 | 22,409 | 73,179 |
| 2034 | 52,289 | 94,992 | 352 | 20 | 17,048 | 164,701 |
| 2035 | 9,293 | 395 | 209 | 11 | 5,394 | 15,303 |
| 2036 | 9,319 | 396 | 209 | 11 | 5,409 | 15,345 |
| 2037 | 9,293 | 395 | 209 | 11 | 5,394 | 15,303 |
| 2038 | 9,293 | 395 | 209 | 11 | 5,394 | 15,303 |
| 2039 | 9,293 | 395 | 209 | 11 | 5,394 | 15,303 |
| 2040 | 9,319 | 396 | 209 | 11 | 5,409 | 15,345 |
| 2041 | 9,293 | 395 | 209 | 11 | 5,394 | 15,303 |
| 2042 | 9,293 | 395 | 209 | 11 | 5,394 | 15,303 |
| 2043 | 9,293 | 395 | 209 | 11 | 5,394 | 15,303 |
| 2044 | 9,319 | 396 | 209 | 11 | 5,409 | 15,345 |
| 2045 | 9,293 | 395 | 209 | 11 | 5,394 | 15,303 |
| 2046 | 9,293 | 395 | 209 | 11 | 5,394 | 15,303 |
| 2047 | 9,293 | 395 | 209 | 11 | 5,394 | 15,303 |
| 2048 | 10,038 | 2,555 | 209 | 11 | 5,409 | 18,223 |
| 2049 | 9,293 | 395 | 209 | 11 | 5,394 | 15,303 |
| 2050 | 10,912 | 5,252 | 209 | 11 | 5,394 | 21,779 |
| 2051 | 10,912 | 5,252 | 209 | 11 | 5,394 | 21,779 |
| 2052 | 10,937 | 5,253 | 209 | 11 | 5,409 | 21,820 |
| 2053 | 10,912 | 5,252 | 209 | 11 | 5,394 | 21,779 |
| 2054 | 10,912 | 5,252 | 209 | 11 | 5,394 | 21,779 |
| 2055 | 10,912 | 5,252 | 209 | 11 | 5,394 | 21,779 |
| 2056 | 10,937 | 5,253 | 209 | 11 | 5,409 | 21,820 |
| 2057 | 10,912 | 5,252 | 209 | 11 | 5,394 | 21,779 |
| 2058 | 18,100 | 26,815 | 209 | 11 | 5,394 | 50,530 |
| 2059 | 10,912 | 5,252 | 209 | 11 | 5,394 | 21,779 |

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TABLE 3.8 (continued)
SCENARIO 8: SAFSTOR WITH 200 YEAR DFS
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|------|--------|--------------------------|--------|--------|--------|---------|
| 2060 | 10,937 | 5,253 | 209 | 11 | 5,409 | 21,820 |
| 2061 | 10,912 | 5,252 | 209 | 11 | 5,394 | 21,779 |
| 2062 | 10,912 | 5,252 | 209 | 11 | 5,394 | 21,779 |
| 2063 | 14,506 | 16,034 | 209 | 11 | 5,394 | 36,154 |
| 2064 | 10,937 | 5,253 | 209 | 11 | 5,409 | 21,820 |
| 2065 | 10,912 | 5,252 | 209 | 11 | 5,394 | 21,779 |
| 2066 | 11,631 | 7,408 | 209 | 11 | 5,394 | 24,654 |
| 2067 | 10,912 | 5,252 | 209 | 11 | 5,394 | 21,779 |
| 2068 | 21,000 | 35,442 | 209 | 11 | 5,409 | 62,072 |
| 2069 | 10,912 | 5,252 | 209 | 11 | 5,394 | 21,779 |
| 2070 | 10,912 | 5,252 | 209 | 11 | 5,394 | 21,779 |
| 2071 | 10,912 | 5,252 | 209 | 11 | 5,394 | 21,779 |
| 2072 | 10,937 | 5,253 | 209 | 11 | 5,409 | 21,820 |
| 2073 | 10,912 | 5,252 | 209 | 11 | 5,394 | 21,779 |
| 2074 | 10,912 | 5,252 | 209 | 11 | 5,394 | 21,779 |
| 2075 | 10,912 | 5,252 | 209 | 11 | 5,394 | 21,779 |
| 2076 | 10,937 | 5,253 | 209 | 11 | 5,409 | 21,820 |
| 2077 | 10,912 | 5,252 | 209 | 11 | 5,394 | 21,779 |
| 2078 | 10,912 | 5,252 | 209 | 11 | 5,394 | 21,779 |
| 2079 | 10,912 | 5,252 | 209 | 11 | 5,394 | 21,779 |
| 2080 | 10,937 | 5,253 | 209 | 11 | 5,409 | 21,820 |
| 2081 | 10,912 | 5,252 | 209 | 11 | 5,394 | 21,779 |
| 2082 | 10,912 | 5,252 | 209 | 11 | 5,394 | 21,779 |
| 2083 | 10,912 | 5,252 | 209 | 11 | 5,394 | 21,779 |
| 2084 | 36,095 | 80,725 | 209 | 11 | 5,409 | 122,450 |
| 2085 | 39,882 | 8,994 | 1,574 | 54 | 5,452 | 55,956 |
| 2086 | 56,570 | 18,301 | 2,065 | 18,514 | 6,701 | 102,152 |
| 2087 | 67,544 | 39,125 | 1,941 | 75,006 | 11,240 | 194,856 |
| 2088 | 60,817 | 16,453 | 1,571 | 21,744 | 8,815 | 109,399 |
| 2089 | 58,571 | 13,747 | 1,488 | 20,202 | 8,536 | 102,545 |

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TABLE 3.8 (continued)
SCENARIO 8: SAFSTOR WITH 200 YEAR DFS
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|------|--------|--------------------------|--------|--------|-------|--------|
| 2090 | 35,101 | 9,949 | 352 | 33 | 5,086 | 50,521 |
| 2091 | 24,492 | 17,115 | 209 | 0 | 5,107 | 46,923 |
| 2092 | 15,474 | 10,026 | 88 | 0 | 3,572 | 29,160 |
| 2093 | 8,932 | 4,910 | 0 | 0 | 2,452 | 16,295 |
| 2094 | 8,932 | 4,910 | 0 | 0 | 2,452 | 16,295 |
| 2095 | 8,991 | 5,152 | 0 | 7,052 | 3,644 | 24,839 |
| 2096 | 8,952 | 4,910 | 0 | 0 | 2,459 | 16,321 |
| 2097 | 8,932 | 4,910 | 0 | 0 | 2,452 | 16,295 |
| 2098 | 8,932 | 4,910 | 0 | 0 | 2,452 | 16,295 |
| 2099 | 8,932 | 4,910 | 0 | 0 | 2,452 | 16,295 |
| 2100 | 8,932 | 4,910 | 0 | 0 | 2,452 | 16,295 |
| 2010 | 8,932 | 4,910 | 0 | 0 | 2,452 | 16,295 |
| 2102 | 8,932 | 4,910 | 0 | 0 | 2,452 | 16,295 |
| 2103 | 8,932 | 4,910 | 0 | 0 | 2,452 | 16,295 |
| 2104 | 8,952 | 4,910 | 0 | 0 | 2,459 | 16,321 |
| 2105 | 8,932 | 4,910 | 0 | 0 | 2,452 | 16,295 |
| 2106 | 8,932 | 4,910 | 0 | 0 | 2,452 | 16,295 |
| 2107 | 8,932 | 4,910 | 0 | 0 | 2,452 | 16,295 |
| 2108 | 16,140 | 26,474 | 0 | 0 | 2,459 | 45,073 |
| 2109 | 8,932 | 4,910 | 0 | 0 | 2,452 | 16,295 |
| 2110 | 8,932 | 4,910 | 0 | 0 | 2,452 | 16,295 |
| 2111 | 8,932 | 4,910 | 0 | 0 | 2,452 | 16,295 |
| 2112 | 8,952 | 4,910 | 0 | 0 | 2,459 | 16,321 |
| 1213 | 12,526 | 15,692 | 0 | 0 | 2,452 | 30,670 |
| 2114 | 8,932 | 4,910 | 0 | 0 | 2,452 | 16,295 |
| 2115 | 8,932 | 4,910 | 0 | 0 | 2,452 | 16,295 |
| 2116 | 9,671 | 7,067 | 0 | 0 | 2,459 | 19,197 |
| 2117 | 8,932 | 4,910 | 0 | 0 | 2,452 | 16,295 |
| 2118 | 18,995 | 35,099 | 0 | 0 | 2,452 | 56,547 |
| 2119 | 8,932 | 4,910 | 0 | 0 | 2,452 | 16,295 |

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TABLE 3.8 (continued)
SCENARIO 8: SAFSTOR WITH 200 YEAR DFS
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|------|--------|--------------------------|--------|--------|-------|---------|
| 2120 | 8,952 | 4,910 | 0 | 0 | 2,459 | 16,321 |
| 2121 | 8,932 | 4,910 | 0 | 0 | 2,452 | 16,295 |
| 2122 | 8,932 | 4,910 | 0 | 0 | 2,452 | 16,295 |
| 2123 | 8,932 | 4,910 | 0 | 0 | 2,452 | 16,295 |
| 2124 | 8,952 | 4,910 | 0 | 0 | 2,459 | 16,321 |
| 2125 | 8,932 | 4,910 | 0 | 0 | 2,452 | 16,295 |
| 2126 | 8,932 | 4,910 | 0 | 0 | 2,452 | 16,295 |
| 2127 | 8,932 | 4,910 | 0 | 0 | 2,452 | 16,295 |
| 2128 | 9,672 | 7,069 | 0 | 0 | 2,459 | 19,199 |
| 2129 | 8,932 | 4,910 | 0 | 0 | 2,452 | 16,295 |
| 2130 | 8,932 | 4,910 | 0 | 0 | 2,452 | 16,295 |
| 2131 | 8,932 | 4,910 | 0 | 0 | 2,452 | 16,295 |
| 2132 | 8,952 | 4,910 | 0 | 0 | 2,459 | 16,321 |
| 2133 | 8,932 | 4,910 | 0 | 0 | 2,452 | 16,295 |
| 2134 | 34,090 | 80,383 | 0 | 0 | 2,452 | 116,925 |
| 2135 | 8,932 | 4,910 | 0 | 0 | 2,452 | 16,295 |
| 2136 | 8,952 | 4,910 | 0 | 0 | 2,459 | 16,321 |
| 2137 | 8,932 | 4,910 | 0 | 0 | 2,452 | 16,295 |
| 2138 | 8,932 | 4,910 | 0 | 0 | 2,452 | 16,295 |
| 2139 | 8,932 | 4,910 | 0 | 0 | 2,452 | 16,295 |
| 2140 | 8,952 | 4,910 | 0 | 0 | 2,459 | 16,321 |
| 2141 | 8,932 | 4,910 | 0 | 0 | 2,452 | 16,295 |
| 2142 | 8,932 | 4,910 | 0 | 0 | 2,452 | 16,295 |
| 2143 | 8,932 | 4,910 | 0 | 0 | 2,452 | 16,295 |
| 2144 | 8,952 | 4,910 | 0 | 0 | 2,459 | 16,321 |
| 2145 | 8,932 | 4,910 | 0 | 0 | 2,452 | 16,295 |
| 2146 | 8,932 | 4,910 | 0 | 0 | 2,452 | 16,295 |
| 2147 | 8,932 | 4,910 | 0 | 0 | 2,452 | 16,295 |
| 2148 | 8,952 | 4,910 | 0 | 0 | 2,459 | 16,321 |
| 2149 | 8,932 | 4,910 | 0 | 0 | 2,452 | 16,295 |

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TABLE 3.8 (continued)
SCENARIO 8: SAFSTOR WITH 200 YEAR DFS
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|------|--------|--------------------------|--------|--------|-------|--------|
| 2150 | 8,932 | 4,910 | 0 | 0 | 2,452 | 16,295 |
| 2151 | 8,932 | 4,910 | 0 | 0 | 2,452 | 16,295 |
| 2152 | 8,952 | 4,910 | 0 | 0 | 2,459 | 16,321 |
| 2153 | 8,932 | 4,910 | 0 | 0 | 2,452 | 16,295 |
| 2154 | 8,932 | 4,910 | 0 | 0 | 2,452 | 16,295 |
| 2155 | 8,932 | 4,910 | 0 | 0 | 2,452 | 16,295 |
| 2156 | 8,952 | 4,910 | 0 | 0 | 2,459 | 16,321 |
| 2157 | 8,932 | 4,910 | 0 | 0 | 2,452 | 16,295 |
| 2158 | 16,120 | 26,474 | 0 | 0 | 2,452 | 45,046 |
| 2159 | 8,932 | 4,910 | 0 | 0 | 2,452 | 16,295 |
| 2160 | 8,952 | 4,910 | 0 | 0 | 2,459 | 16,321 |
| 2161 | 8,932 | 4,910 | 0 | 0 | 2,452 | 16,295 |
| 2162 | 8,932 | 4,910 | 0 | 0 | 2,452 | 16,295 |
| 2163 | 12,526 | 15,692 | 0 | 0 | 2,452 | 30,670 |
| 2164 | 8,952 | 4,910 | 0 | 0 | 2,459 | 16,321 |
| 2165 | 8,932 | 4,910 | 0 | 0 | 2,452 | 16,295 |
| 2166 | 9,651 | 7,067 | 0 | 0 | 2,452 | 19,170 |
| 2167 | 8,932 | 4,910 | 0 | 0 | 2,452 | 16,295 |
| 2168 | 19,735 | 37,258 | 0 | 0 | 2,459 | 59,451 |
| 2169 | 8,932 | 4,910 | 0 | 0 | 2,452 | 16,295 |
| 2170 | 8,932 | 4,910 | 0 | 0 | 2,452 | 16,295 |
| 2171 | 8,932 | 4,910 | 0 | 0 | 2,452 | 16,295 |
| 2172 | 8,952 | 4,910 | 0 | 0 | 2,459 | 16,321 |
| 2173 | 8,932 | 4,910 | 0 | 0 | 2,452 | 16,295 |
| 2174 | 8,932 | 4,910 | 0 | 0 | 2,452 | 16,295 |
| 2175 | 8,932 | 4,910 | 0 | 0 | 2,452 | 16,295 |
| 2176 | 8,952 | 4,910 | 0 | 0 | 2,459 | 16,321 |
| 2177 | 8,932 | 4,910 | 0 | 0 | 2,452 | 16,295 |
| 2178 | 8,932 | 4,910 | 0 | 0 | 2,452 | 16,295 |
| 2179 | 8,932 | 4,910 | 0 | 0 | 2,452 | 16,295 |

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TABLE 3.8 (continued)
SCENARIO 8: SAFSTOR WITH 200 YEAR DFS
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|------|--------|--------------------------|--------|--------|-------|---------|
| 2180 | 8,952 | 4,910 | 0 | 0 | 2,459 | 16,321 |
| 2181 | 8,932 | 4,910 | 0 | 0 | 2,452 | 16,295 |
| 2182 | 8,932 | 4,910 | 0 | 0 | 2,452 | 16,295 |
| 2183 | 8,932 | 4,910 | 0 | 0 | 2,452 | 16,295 |
| 2184 | 34,110 | 80,383 | 0 | 0 | 2,459 | 116,951 |
| 2185 | 8,932 | 4,910 | 0 | 0 | 2,452 | 16,295 |
| 2186 | 8,932 | 4,910 | 0 | 0 | 2,452 | 16,295 |
| 2187 | 8,932 | 4,910 | 0 | 0 | 2,452 | 16,295 |
| 2188 | 8,952 | 4,910 | 0 | 0 | 2,459 | 16,321 |
| 2189 | 8,932 | 4,910 | 0 | 0 | 2,452 | 16,295 |
| 2190 | 8,932 | 4,910 | 0 | 0 | 2,452 | 16,295 |
| 2191 | 8,932 | 4,910 | 0 | 0 | 2,452 | 16,295 |
| 2192 | 9,672 | 7,070 | 0 | 0 | 2,459 | 19,201 |
| 2193 | 10,192 | 8,690 | 0 | 0 | 2,452 | 21,334 |
| 2194 | 9,112 | 5,450 | 0 | 0 | 2,452 | 17,015 |
| 2195 | 10,012 | 8,150 | 0 | 0 | 2,452 | 20,614 |
| 2196 | 10,392 | 9,230 | 0 | 0 | 2,459 | 22,081 |
| 2197 | 7,296 | 0 | 0 | 0 | 2,452 | 9,747 |
| 2198 | 7,296 | 0 | 0 | 0 | 2,452 | 9,747 |
| 2199 | 7,296 | 0 | 0 | 0 | 2,452 | 9,747 |
| 2200 | 7,296 | 0 | 0 | 0 | 2,452 | 9,747 |
| 2201 | 7,296 | 0 | 0 | 0 | 2,452 | 9,747 |
| 2202 | 7,296 | 0 | 0 | 0 | 2,452 | 9,747 |
| 2203 | 7,296 | 0 | 0 | 0 | 2,452 | 9,747 |
| 2204 | 7,316 | 0 | 0 | 0 | 2,459 | 9,774 |
| 2205 | 7,296 | 0 | 0 | 0 | 2,452 | 9,747 |
| 2206 | 7,296 | 0 | 0 | 0 | 2,452 | 9,747 |
| 2207 | 7,296 | 0 | 0 | 0 | 2,452 | 9,747 |
| 2208 | 15,223 | 23,722 | 0 | 0 | 2,459 | 41,403 |
| 2209 | 7,296 | 0 | 0 | 0 | 2,452 | 9,747 |

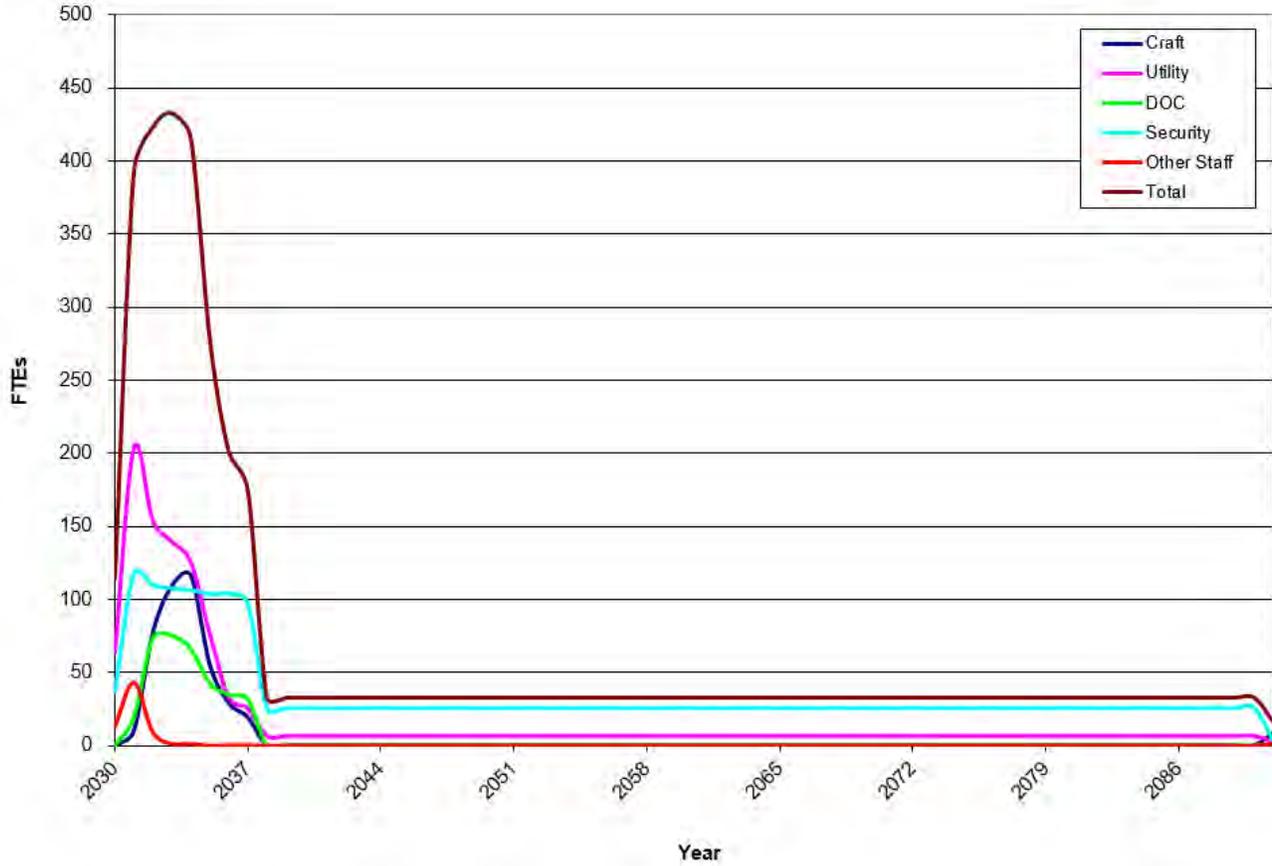
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TABLE 3.8 (continued)
SCENARIO 8: SAFSTOR WITH 200 YEAR DFS
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|--------------|------------------|--------------------------|---------------|----------------|----------------|------------------|
| 2210 | 7,296 | 0 | 0 | 0 | 2,452 | 9,747 |
| 2211 | 7,296 | 0 | 0 | 0 | 2,452 | 9,747 |
| 2212 | 7,316 | 0 | 0 | 0 | 2,459 | 9,774 |
| 2213 | 10,890 | 10,782 | 0 | 0 | 2,452 | 24,123 |
| 2214 | 7,296 | 0 | 0 | 0 | 2,452 | 9,747 |
| 2215 | 7,296 | 0 | 0 | 0 | 2,452 | 9,747 |
| 2216 | 8,034 | 2,156 | 0 | 0 | 2,459 | 12,649 |
| 2217 | 7,296 | 0 | 0 | 0 | 2,452 | 9,747 |
| 2218 | 17,878 | 31,746 | 0 | 0 | 2,452 | 52,075 |
| 2219 | 7,918 | 1,868 | 0 | 0 | 2,452 | 12,238 |
| 2220 | 7,835 | 1,557 | 0 | 0 | 2,459 | 11,850 |
| 2221 | 7,815 | 1,557 | 0 | 0 | 2,452 | 11,823 |
| 2222 | 7,815 | 1,557 | 0 | 0 | 2,452 | 11,823 |
| 2223 | 7,918 | 1,868 | 0 | 0 | 2,452 | 12,238 |
| 2224 | 7,835 | 1,557 | 0 | 0 | 2,459 | 11,850 |
| 2225 | 7,815 | 1,557 | 0 | 0 | 2,452 | 11,823 |
| 2226 | 7,815 | 1,557 | 0 | 0 | 2,452 | 11,823 |
| 2227 | 7,918 | 1,868 | 0 | 0 | 2,452 | 12,238 |
| 2228 | 7,835 | 1,557 | 0 | 0 | 2,459 | 11,850 |
| 2229 | 7,815 | 1,557 | 0 | 0 | 2,452 | 11,823 |
| 2230 | 7,451 | 1,976 | 0 | 0 | 7,406 | 16,833 |
| 2231 | 1,941 | 1,243 | 22 | 354 | 3,617 | 7,177 |
| | | | | | | |
| Total | 2,444,586 | 1,500,117 | 24,005 | 145,004 | 782,589 | 4,896,302 |

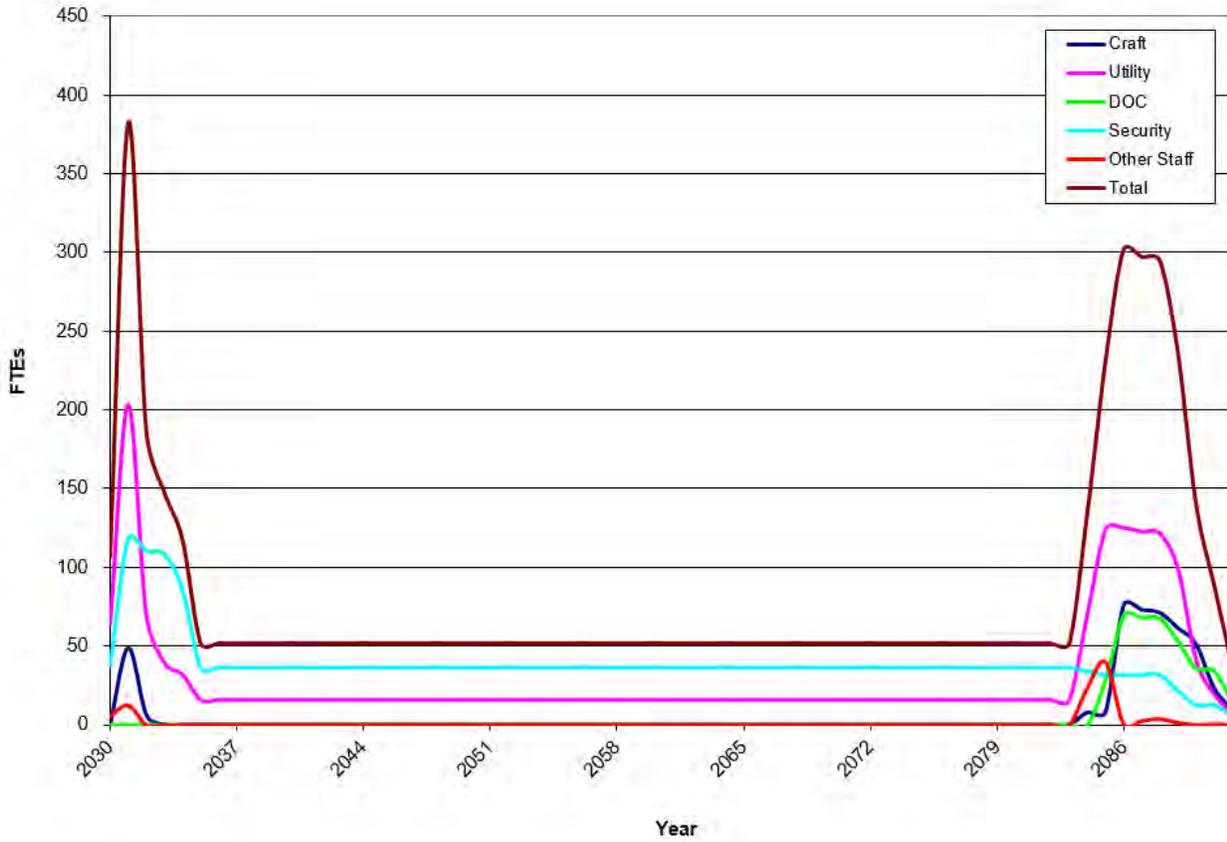
Note: Columns may not add due to rounding

**FIGURE 3.1
 SCENARIO 2: DECON WITH 60 YEAR DFS
 MONTICELLO NUCLEAR GENERATING PLANT
 MANPOWER LEVELS**



Note that the labor hour basis of this chart was taken from Appendix D; however not all line items in Appendix D have labor hour values available (e.g. spent fuel canister loading estimates from Xcel Energy)

**FIGURE 3.2
 SCENARIO 6: SAFSTOR WITH 60 YEAR DFS
 MONTICELLO NUCLEAR GENERATING PLANT
 MANPOWER LEVELS**



Note that the labor hour basis of this chart was taken from Appendix H; however not all line items in Appendix H have labor hour values available (e.g. spent fuel canister loading estimates from Xcel Energy)

4. SCHEDULE ESTIMATE

The schedules for the decommissioning scenarios considered in this study follow the sequence presented in the AIF/NESP-036 study, with minor changes to reflect recent experience and site-specific constraints. In addition, the scheduling has been revised to reflect the spent fuel management plans described in Section 3.4.1.

A schedule or sequence of activities for the DECON alternative is presented in Figure 4.1. The schedule is also representative of the work activities identified in the delayed dismantling scenarios, absent any spent fuel constraints. The scheduling sequence is based on the fuel being removed from the spent fuel pool within the first four years after operations cease. The key activities listed in the schedule do not reflect a one-to-one correspondence with those activities in the cost tables, but reflect dividing some activities for clarity and combining others for convenience. The schedule was prepared using the "Microsoft Project Professional" computer software. [43]

4.1 SCHEDULE ESTIMATE ASSUMPTIONS

The schedule reflects the results of a precedence network developed for the site decommissioning activities, i.e., a PERT (Program Evaluation and Review Technique) Software Package. The work activity durations used in the precedence network reflect the actual man-hour estimates from the cost table, adjusted by stretching certain activities over their slack range and shifting the start and end dates of others. The following assumptions were made in the development of the decommissioning schedule:

- The reactor building is isolated until such time that all spent fuel has been discharged from the storage pool to the ISFSI. Decontamination and dismantling of the spent fuel storage pool is initiated once the transfer of spent fuel is complete (DECON option).
- All work (except vessel and internals removal) is performed during an 8-hour workday, 5 days per week, with no overtime. There are eleven paid holidays per year.
- Reactor and internals removal activities are performed by using separate crews for different activities working on different shifts, with a corresponding backshift charge for the second shift.
- Multiple crews work parallel activities to the maximum extent possible, consistent with optimum efficiency, adequate access for cutting, removal and laydown space, and with the stringent safety measures necessary during demolition of heavy components and structures.

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- For plant systems removal, the systems with the longest removal durations in areas on the critical path are considered to determine the duration of the activity.

4.2 PROJECT SCHEDULE

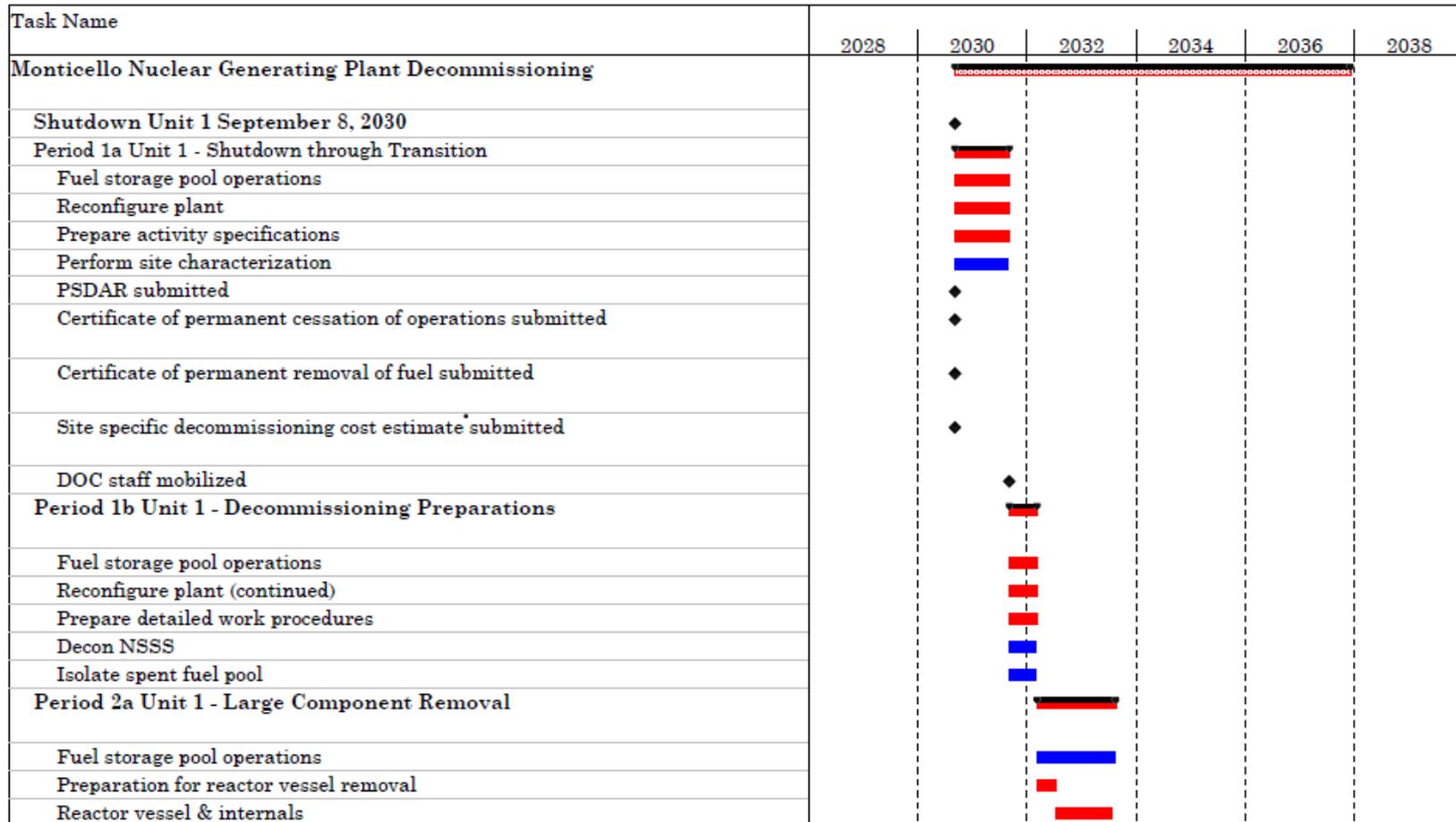
The period-dependent costs presented in the detailed cost tables are based upon the durations developed in the schedules for decommissioning Monticello. Durations are established between several milestones in each project period; these durations are used to establish a critical path for the entire project. In turn, the critical path duration for each period is used as the basis for determining the period-dependent costs. A second parallel path is also shown for the spent fuel cooling period, which determines the release of the reactor building for final decontamination.

Project timelines are provided in Figures 4.2 through 4.9, with milestone dates based on a 2030 shutdown date. The spent fuel pool is emptied approximately four years after shutdown, while ISFSI operations continue until the DOE completes the transfer of assemblies. Deferred decommissioning operations in the all scenarios are assumed to commence so that the operating license is terminated within a 60-year period from the cessation of operations.

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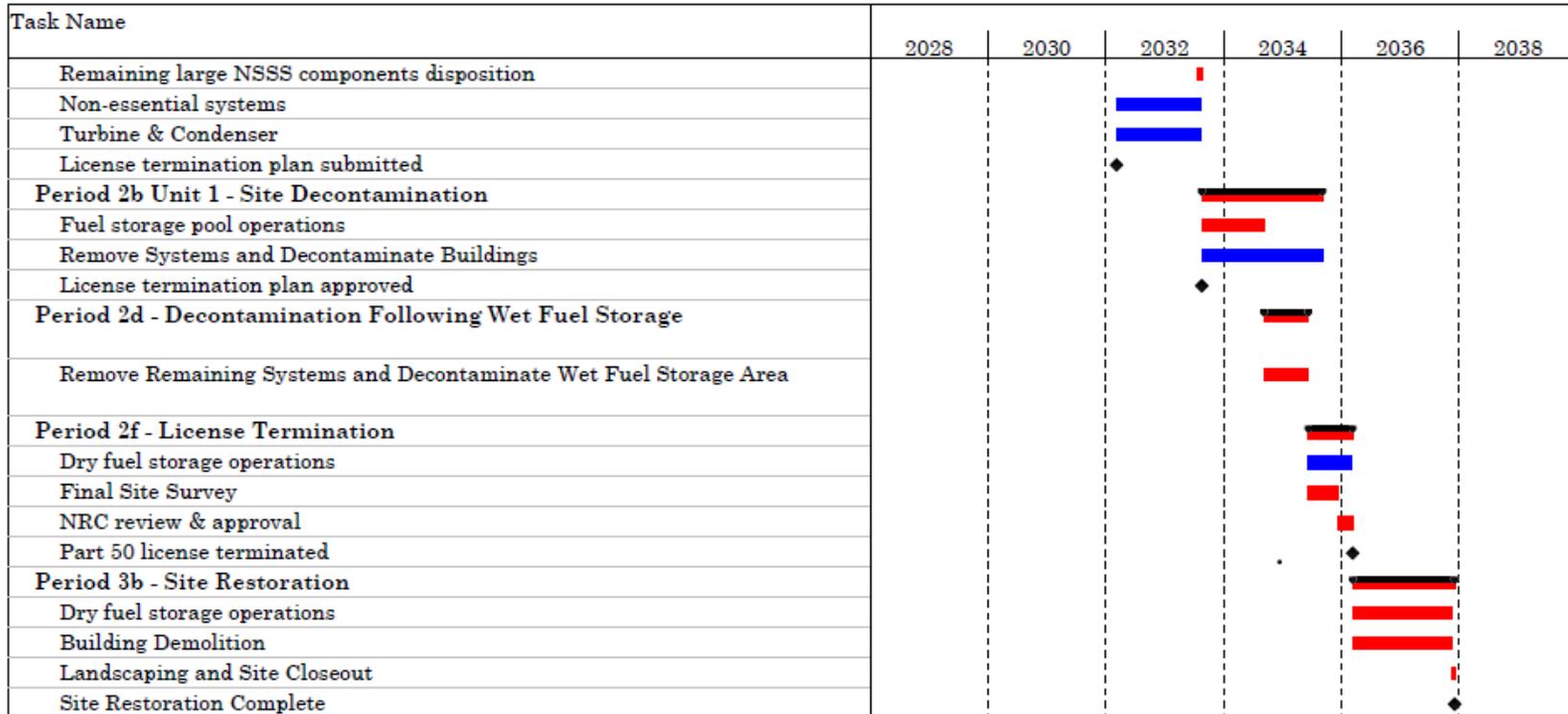
**FIGURE 4.1
 DECON ACTIVITY SCHEDULE**



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**FIGURE 4.1 (continued)
 DECON ACTIVITY SCHEDULE**

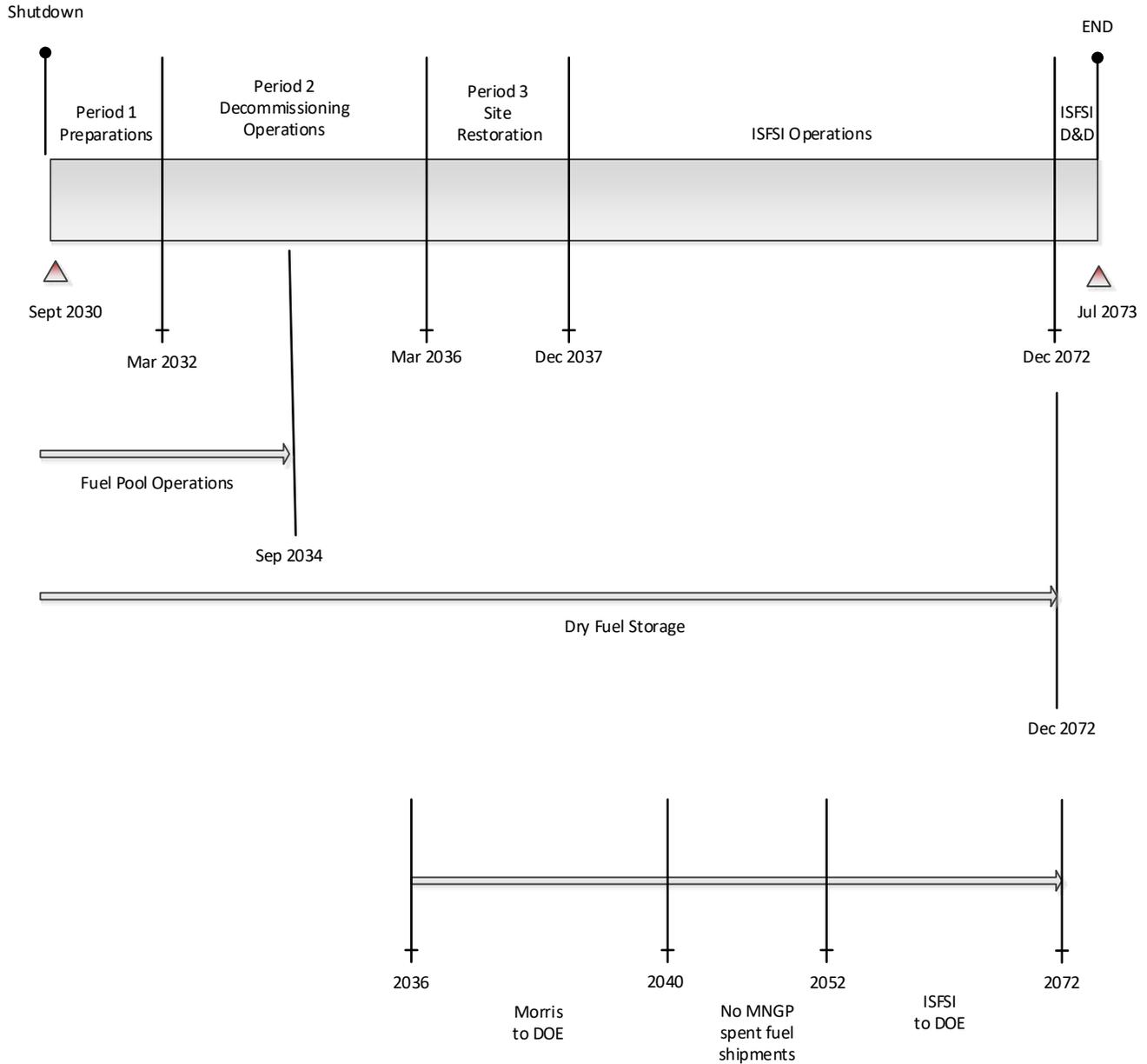


1. Red scheduling bars indicate critical path activities
2. Blue scheduling bars associated with non-critical path activities
3. Diamond symbols indicate major milestones

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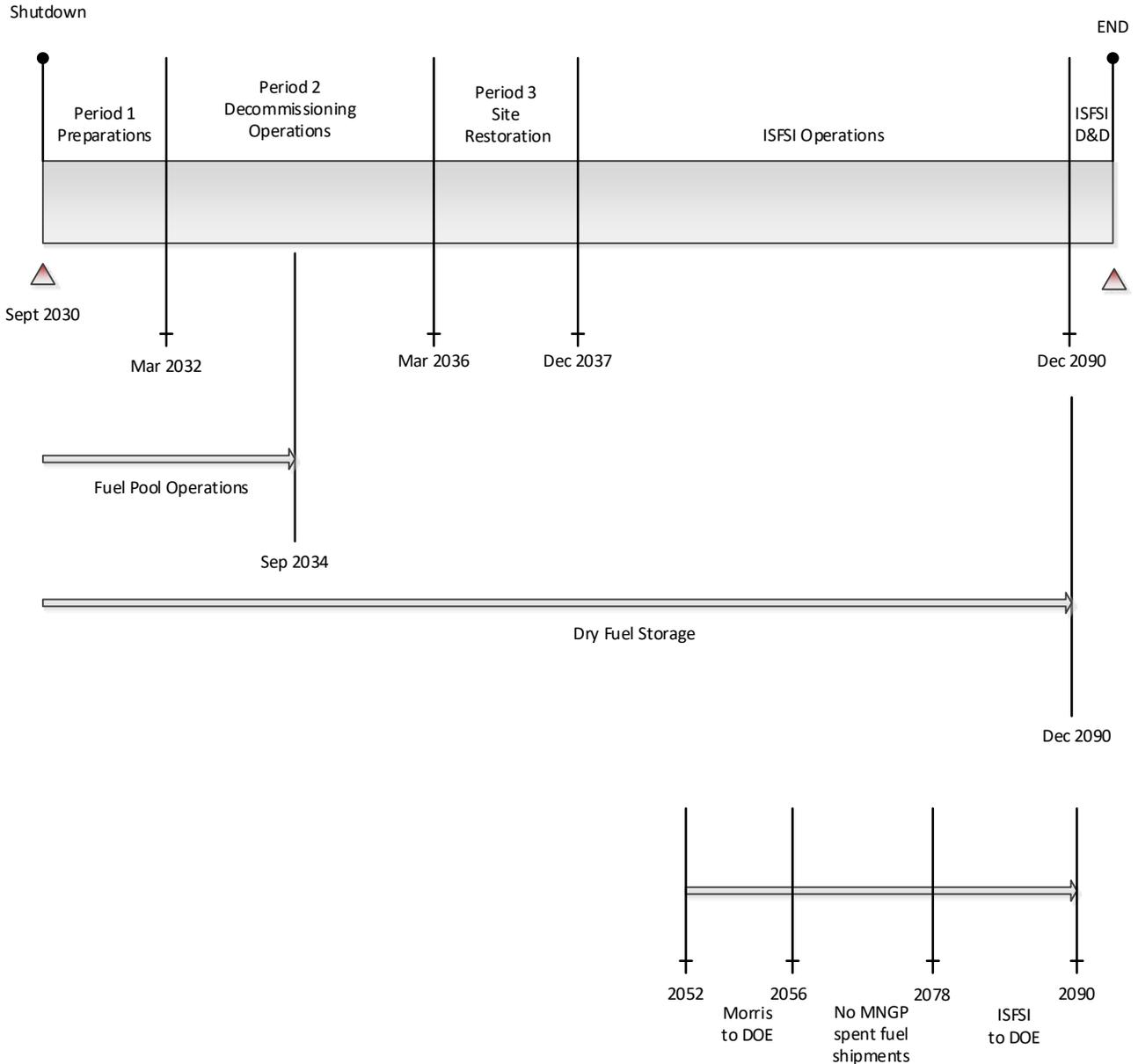
**FIGURE 4.2
SCENARIO 1: DECON WITH 42 YEAR DFS
DECOMMISSIONING TIMELINE**



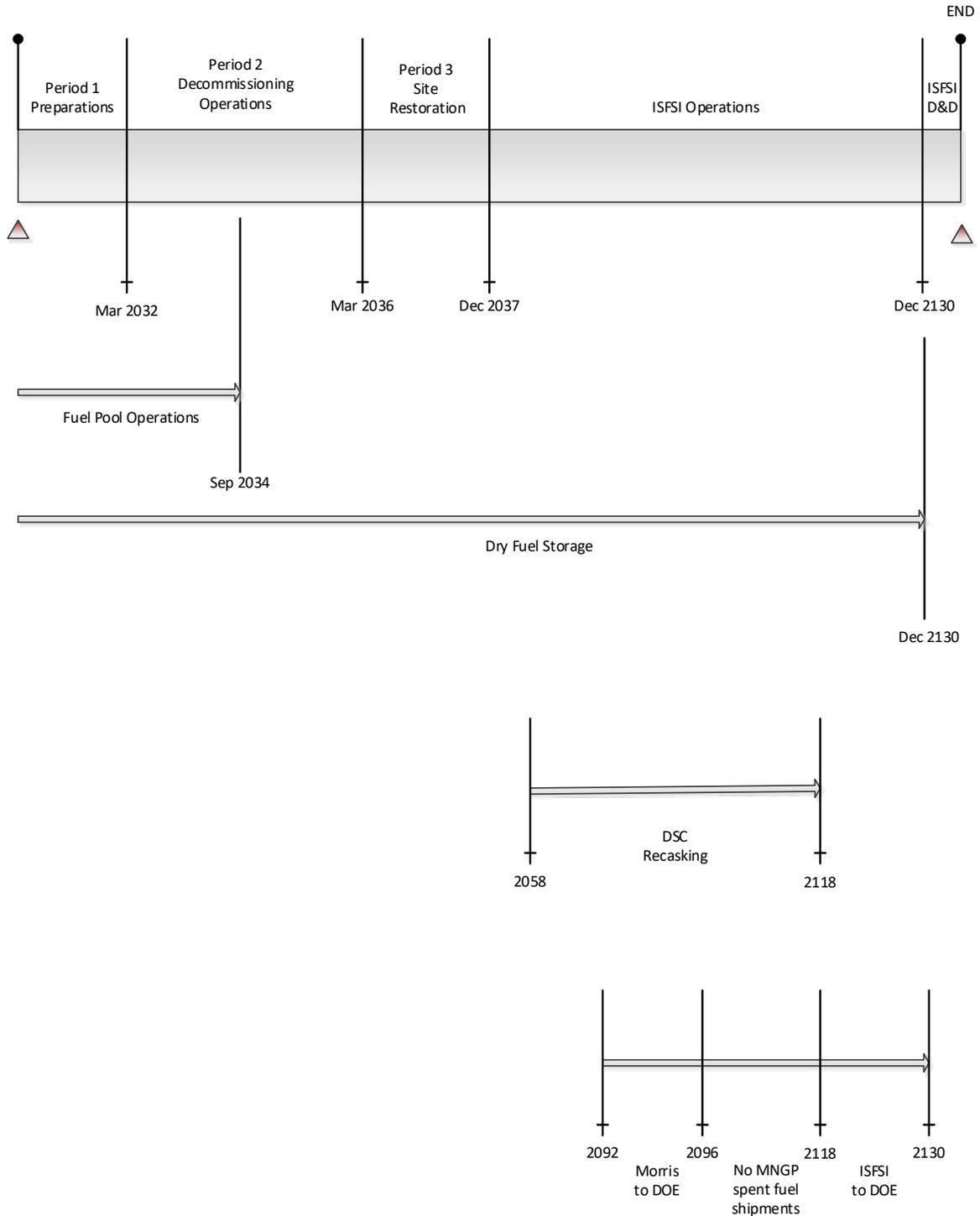
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**FIGURE 4.3
SCENARIO 2: DECON WITH 60 YEAR DFS
DECOMMISSIONING TIMELINE
(not to scale)**



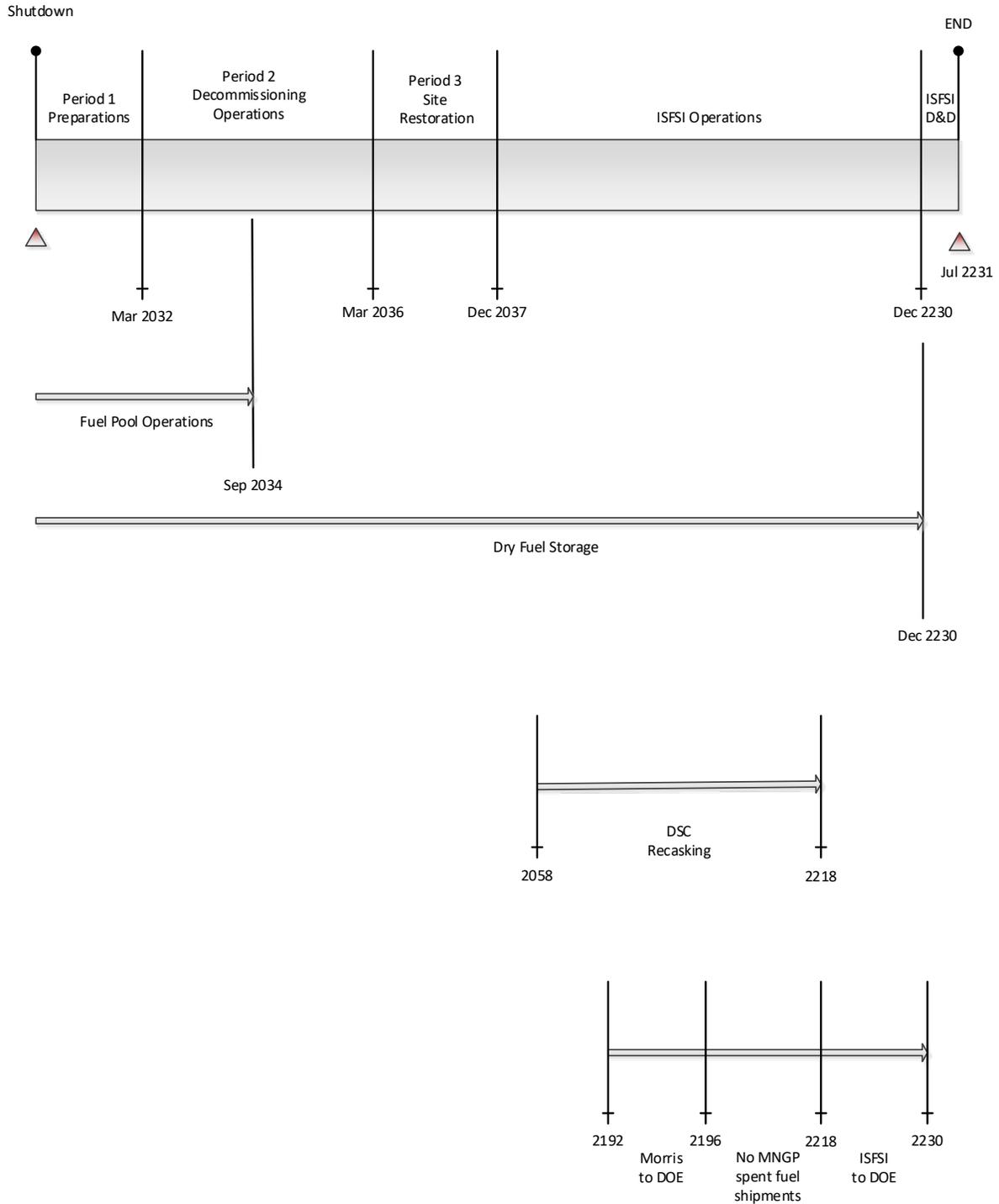
**FIGURE 4.4
SCENARIO 3: DECON WITH 100 YEAR DFS
DECOMMISSIONING TIMELINE**



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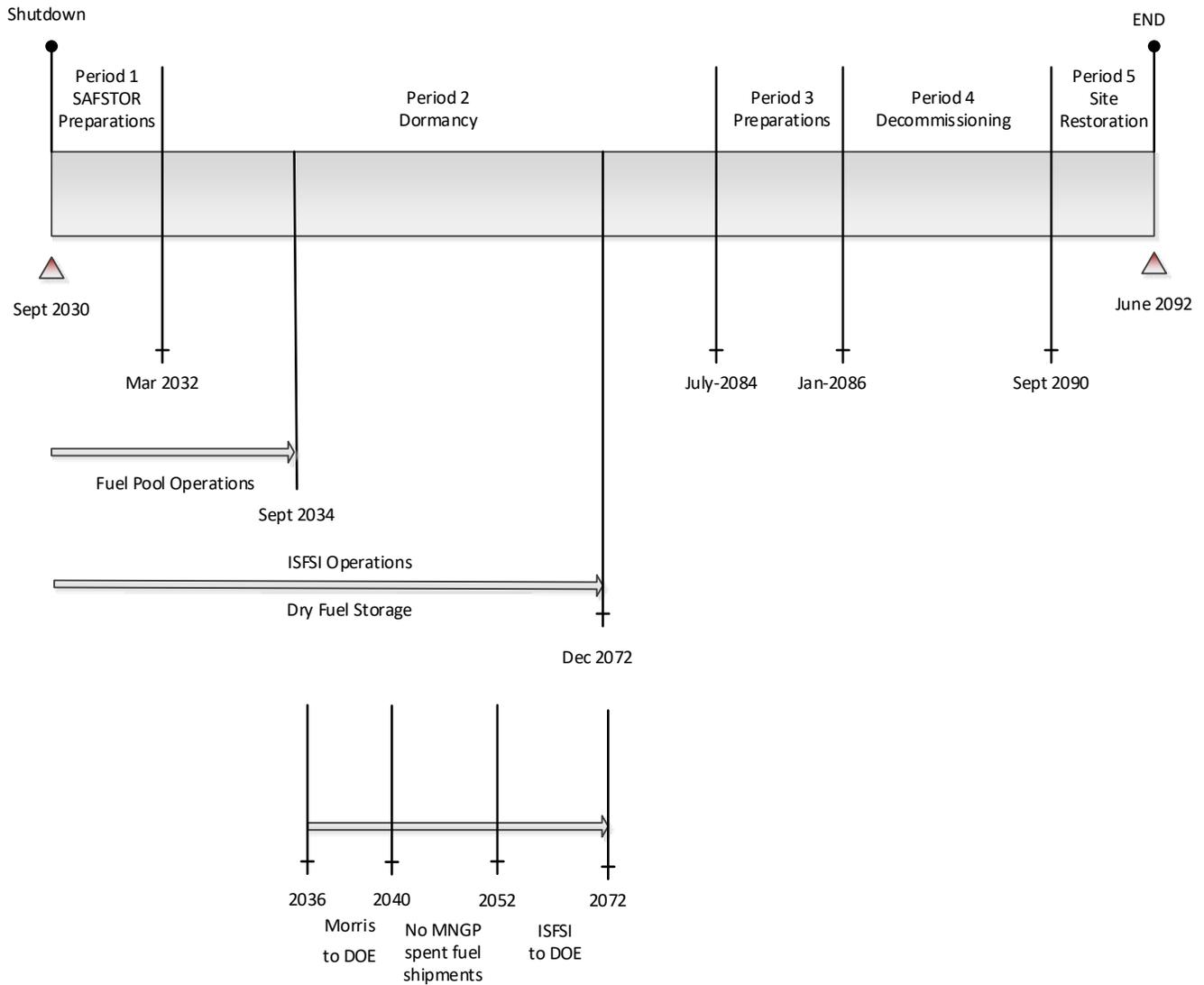
**FIGURE 4.5
SCENARIO 4: DECON WITH 200 YEAR DFS
DECOMMISSIONING TIMELINE
(not to scale)**



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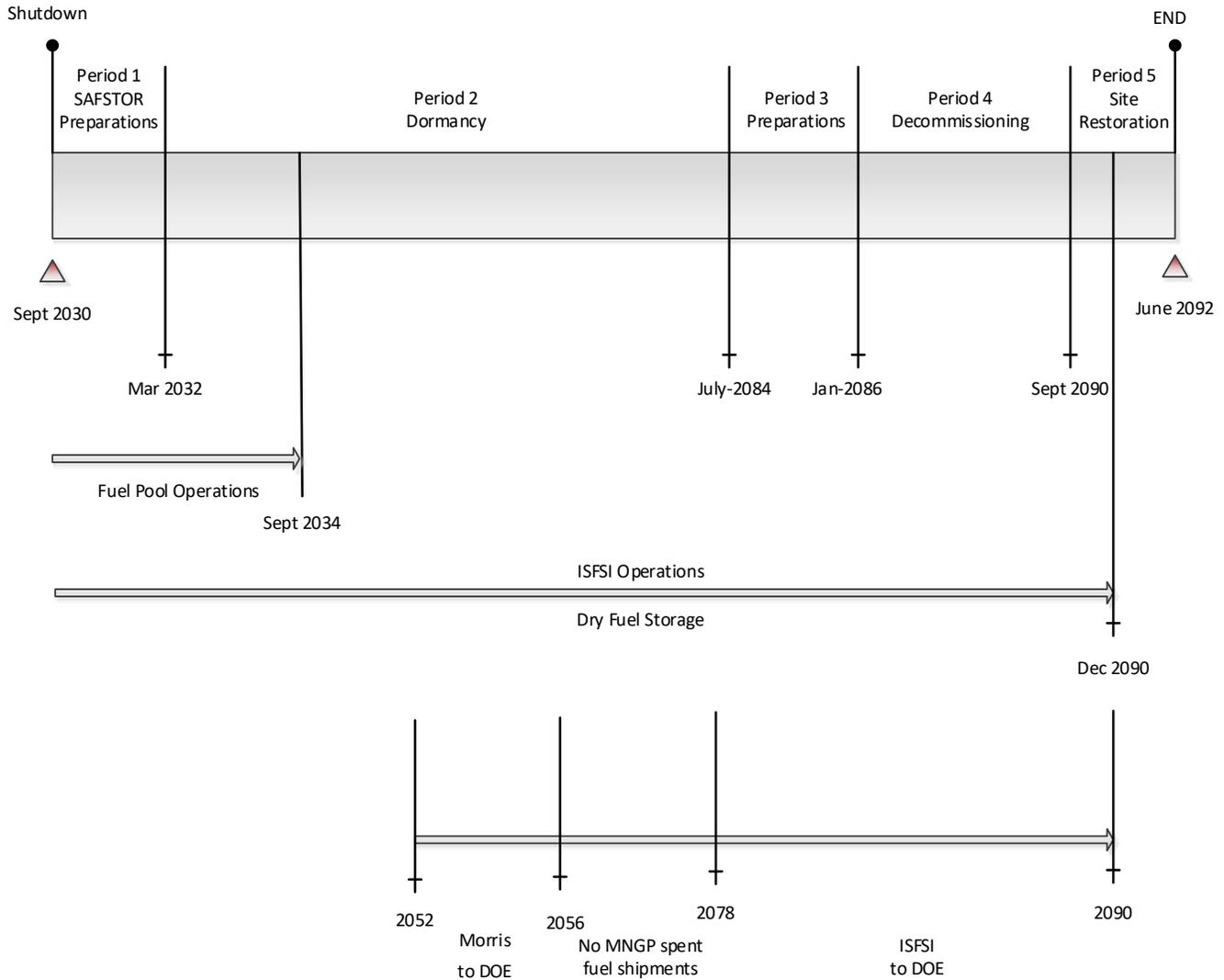
**FIGURE 4.6
SCENARIO 5: SAFSTOR WITH 42 YEAR DFS
DECOMMISSIONING TIMELINE**



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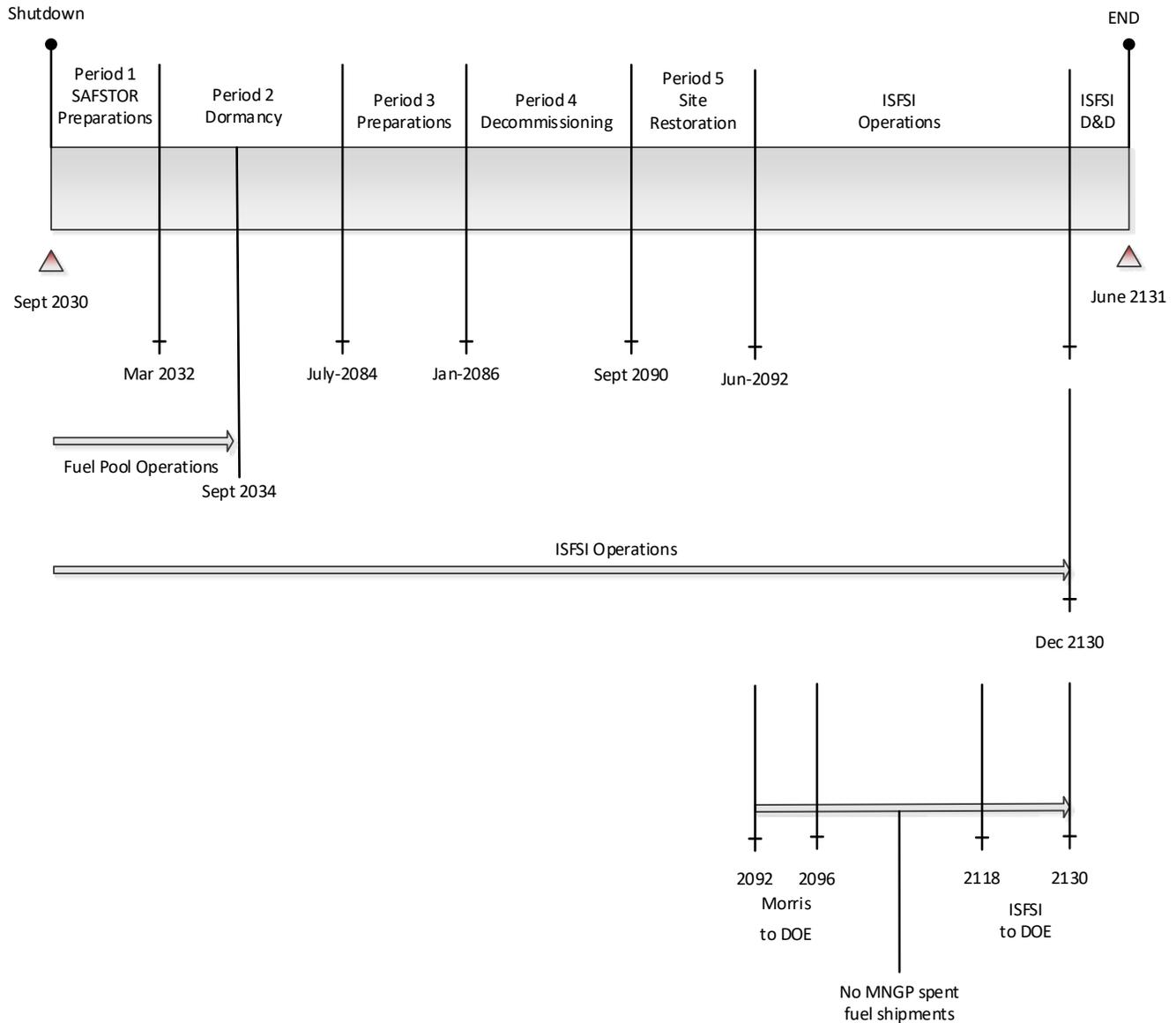
**FIGURE 4.7
SCENARIO 6: SAFSTOR WITH 60 YEAR DFS
DECOMMISSIONING TIMELINE**
(not to scale)



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**FIGURE 4.8
 SCENARIO 7: SAFSTOR WITH 100 YEAR DFS
 DECOMMISSIONING TIMELINE**
 (not to scale)



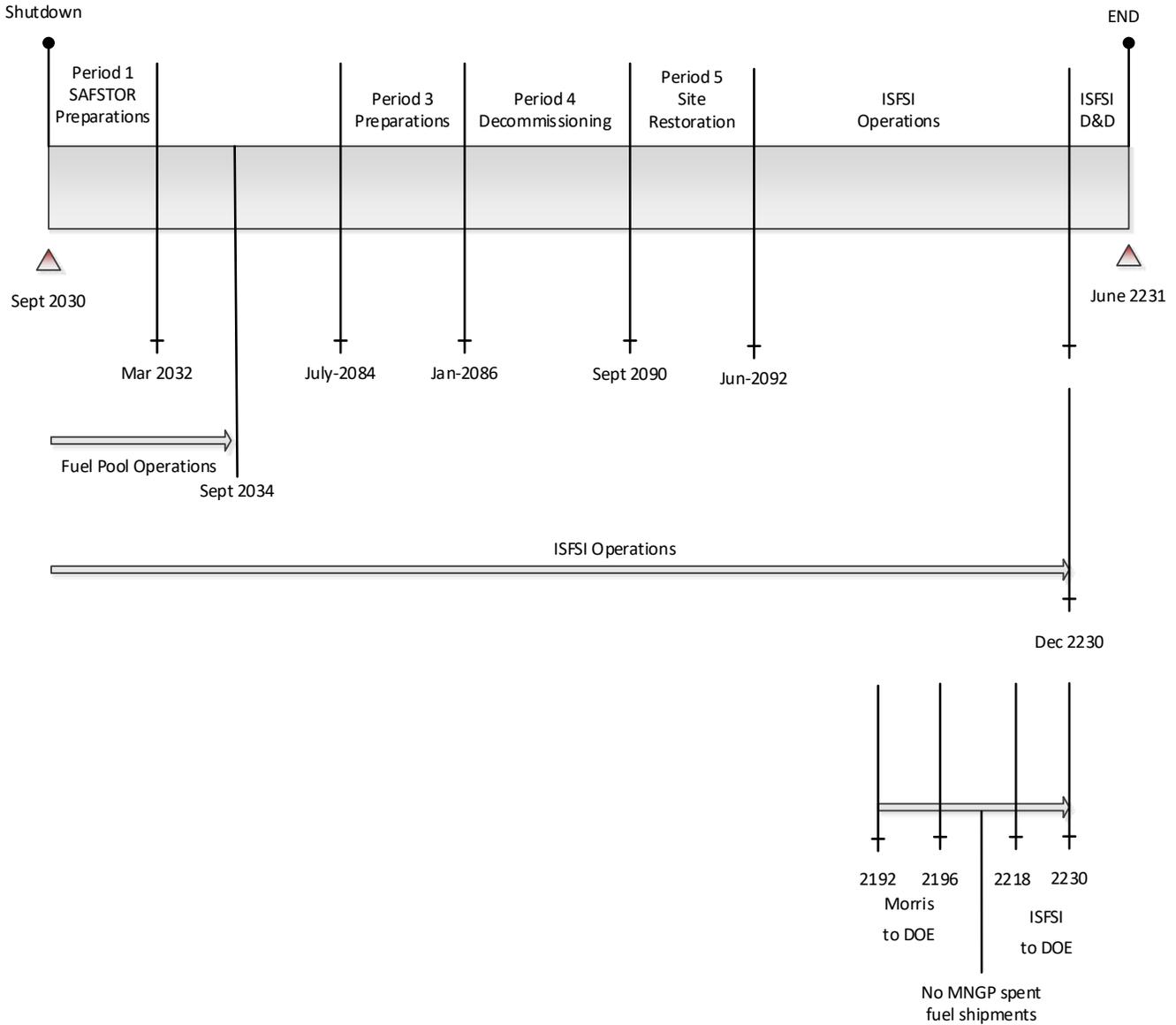
Recasking campaigns occur 2058 through 2084, and 2108 through 2118.

DOE pickup of fuel occurs from 2118 to 2130.

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**FIGURE 4.9
 SCENARIO 8: SAFSTOR WITH 200 YEAR DFS
 DECOMMISSIONING TIMELINE**
 (not to scale)



Recasking campaigns occur 2058 through 2084, 2108 through 2134, 2158 through 2184, and 2208 through 2218.

DOE pickup of fuel occurs from 2218 to 2130.

5. RADIOACTIVE WASTES

The objectives of the decommissioning process are the removal of all radioactive material from the site that would restrict its future use and the termination of the NRC license. This currently requires the remediation of all radioactive material at the site in excess of applicable legal limits. Under the Atomic Energy Act, ^[44] the NRC is responsible for protecting the public from sources of ionizing radiation. Title 10 of the Code of Federal Regulations delineates the production, utilization, and disposal of radioactive materials and processes. In particular, Part 71 defines radioactive material as it pertains to transportation and Part 61 specifies its disposition.

Most of the materials being transported for controlled burial are categorized as Low Specific Activity (LSA) or Surface Contaminated Object (SCO) materials containing Type A quantities, as defined in 49 CFR Parts 173-178. Shipping containers are required to be Industrial Packages (IP-1, IP-2 or IP-3, as defined in 10 CFR §173.411). For this study, commercially available steel containers are presumed to be used for the disposal of piping, small components, and concrete. Larger components can serve as their own containers, with proper closure of all openings, access ways, and penetrations.

The destinations for the various waste streams from decommissioning are identified in Figures 5.1 and 5.2. The volumes of radioactive waste generated during the various decommissioning activities at the site are shown on a line-item basis in Appendices C through J and summarized in Tables 5.1 through 5.8. The quantified waste volume summaries shown in these tables are consistent with §61 classifications. The volumes are calculated based on the exterior dimensions for containerized material and on the displaced volume of components serving as their own waste containers.

The reactor vessel and internals are categorized as large quantity shipments and, accordingly, will be shipped in reusable, shielded truck casks with disposable liners. In calculating disposal costs, the burial fees are applied against the liner volume, as well as the special handling requirements of the payload. Packaging efficiencies are lower for the highly activated materials (greater than Type A quantity waste), where high concentrations of gamma-emitting radionuclides limit the capacity of the shipping canisters.

No process system containing/handling radioactive substances at shutdown is presumed to meet material release criteria by decay alone, i.e., systems radioactive at shutdown will still be radioactive over the time period during which the decommissioning is accomplished, due to the presence of long-lived radionuclides.

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While the dose rates decrease with time, radionuclides such as ^{137}Cs will still control the disposition requirements.

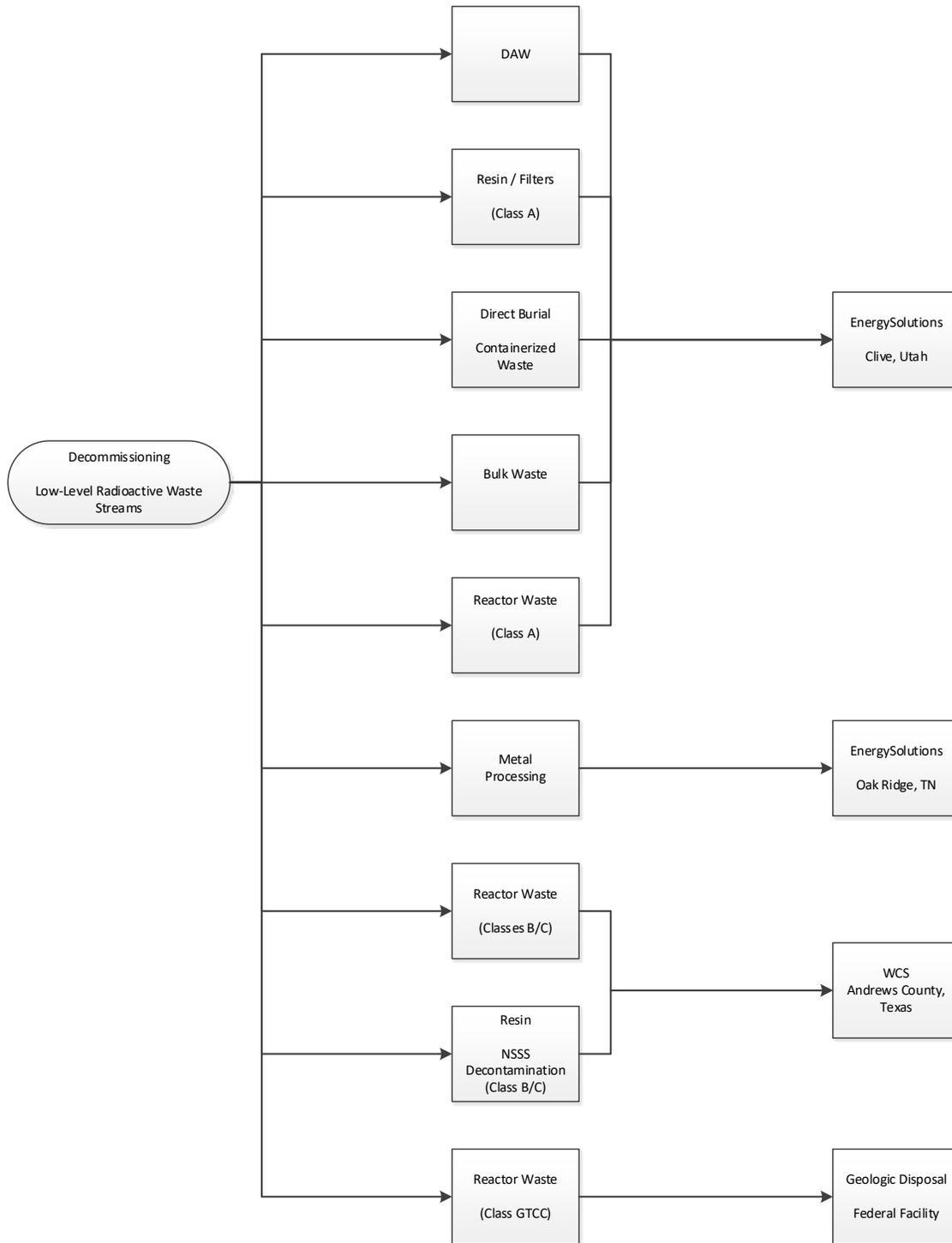
The waste material generated in the decontamination and dismantling of Monticello is primarily generated during Period 2 of the DECON alternatives and Period 4 of the SAFSTOR alternatives. Material that is considered potentially contaminated when removed from the radiologically controlled area is sent to processing facilities in Tennessee for conditioning and disposal. Heavily contaminated components and activated materials are routed for controlled disposal. The disposal volumes reported in the tables reflect the savings resulting from reprocessing and recycling.

Disposal fees are calculated using representative costs, with surcharges added for the highly activated components, for example, generated in the segmentation of the reactor vessel. The cost to dispose of the majority of the material generated from the decontamination and dismantling activities is based upon representative rates.

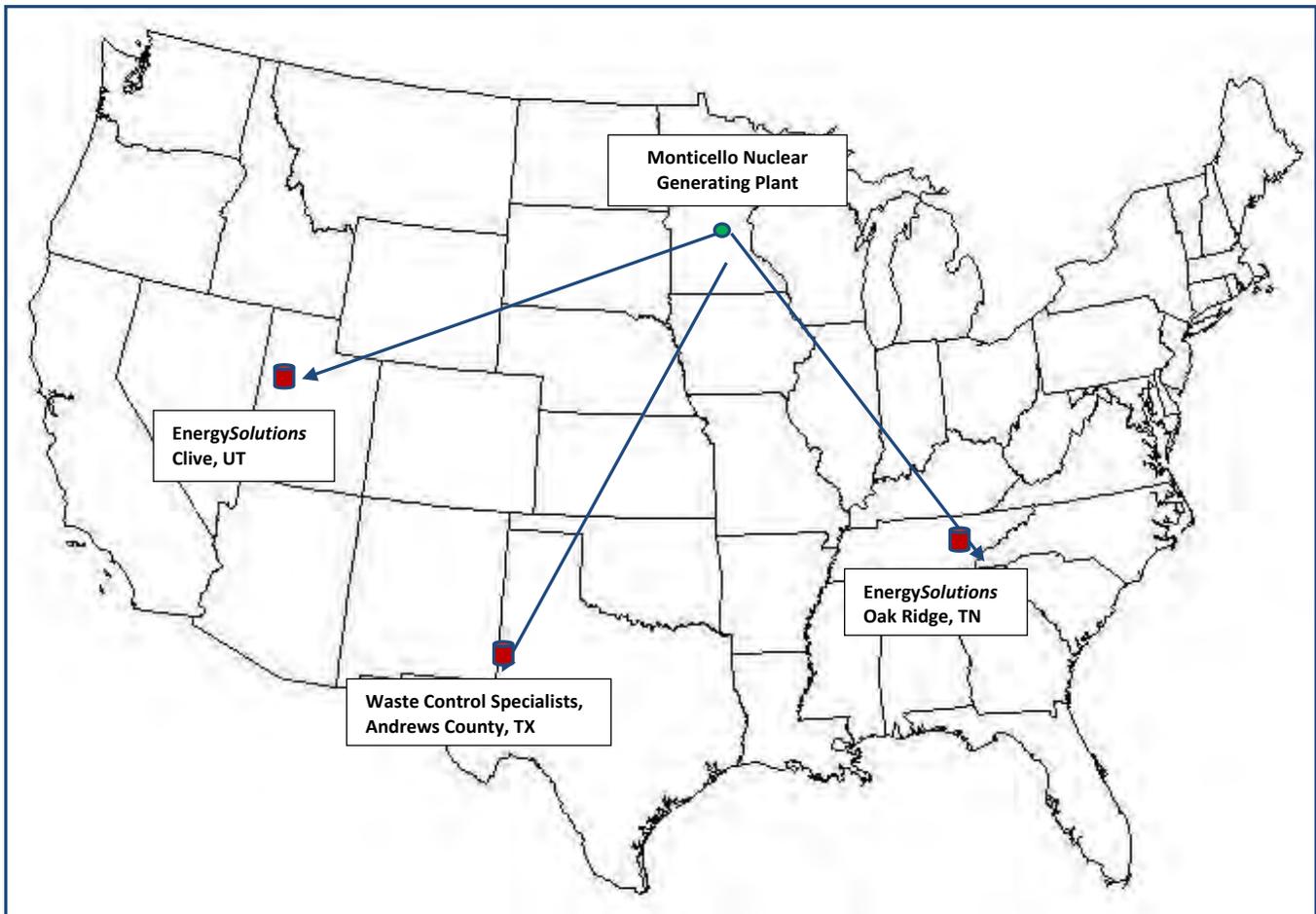
EnergySolutions is not able to accept the higher activity waste (Class B and C) generated in the decontamination of the NSSS and segmentation of the components closest to the core. Waste disposal costs for the higher activity waste (Class B and C) are based upon preliminary and indicative information on the cost for such from WCS.

A small quantity of material generated during the Monticello decommissioning will not be considered suitable for near-surface disposal, and is assumed to be disposed of in a geologic repository, in a manner similar to that envisioned for spent fuel disposal. Such material, known as Greater-Than-Class-C or GTCC material, is estimated to require four spent fuel storage canisters (or the equivalent) to dispose of the most radioactive portions of the reactor vessel internals. The volume and weight reported in Tables 5.1 through 5.8 represent the packaged weight and volume of the spent fuel storage canisters.

**FIGURE 5.1
RADIOACTIVE WASTE DISPOSITION**



**FIGURE 5.2
DECOMMISSIONING WASTE DESTINATIONS
RADIOLOGICAL**



The figure indicates the destinations for the low-level radioactive waste designated for direct disposal (Clive, Utah) and processing/recovery (Oak Ridge, Tennessee).

Disposition of the Class B and C low-level radioactive waste will be at the Waste Control Specialists site in Andrews County, Texas.

Disposition options (and destinations) for GTCC are still being evaluated.

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Section 5, Page 5 of 12****TABLE 5.1
SCENARIO 1: DECON WITH 42 YEAR DFS
DECOMMISSIONING WASTE SUMMARY**

| Waste | Cost Basis | Class ^[1] | Waste Volume (cubic feet) | Mass (pounds) |
|---|---|----------------------|------------------------------|------------------|
| Low-Level Radioactive Waste (near-surface disposal) | EnergySolutions Containerized | A | 122,218 | 7,165,609 |
| | EnergySolutions Bulk | A | 75,053 | 4,661,497 |
| | Future LLRW Disposal Facility (Proxy) | B | 1,992 | 228,038 |
| | Future LLRW Disposal Facility (Proxy) | C | 898 | 67,710 |
| Greater than Class C (geologic repository) | Spent Fuel Equivalent | GTCC | 1,160 | 225,765 |
| | | | | |
| Total ^[2] | | | 201,320 | 12,348,619 |
| | | | | |
| Processed/Conditioned (off-site recycling center) | Recycling Vendors | A | 288,203 | 12,125,960 |
| | | | | |
| Scrap Metal | | | | 46,246,000 |

^[1] Waste is classified according to the requirements as delineated in Title 10 CFR, Part 61.55

^[2] Columns may not add due to rounding

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SCENARIO 2: DECON WITH 60 YEAR DFS
DECOMMISSIONING WASTE SUMMARY**

| Waste | Cost Basis | Class ^[1] | Waste Volume (cubic feet) | Mass (pounds) |
|---|---|----------------------|------------------------------|------------------|
| Low-Level Radioactive Waste (near-surface disposal) | EnergySolutions Containerized | A | 122,218 | 7,165,609 |
| | EnergySolutions Bulk | A | 75,053 | 4,661,497 |
| | Future LLRW Disposal Facility (Proxy) | B | 1,992 | 228,038 |
| | Future LLRW Disposal Facility (Proxy) | C | 898 | 67,710 |
| Greater than Class C (geologic repository) | Spent Fuel Equivalent | GTCC | 1,160 | 225,765 |
| | | | | |
| Total ^[2] | | | 201,320 | 12,348,619 |
| | | | | |
| Processed/Conditioned (off-site recycling center) | Recycling Vendors | A | 288,203 | 12,125,960 |
| | | | | |
| Scrap Metal | | | | 46,246,000 |

^[1] Waste is classified according to the requirements as delineated in Title 10 CFR, Part 61.55

^[2] Columns may not add due to rounding

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SCENARIO 4: DECON WITH 200 YEAR DFS
DECOMMISSIONING WASTE SUMMARY**

| Waste | Cost Basis | Class ^[1] | Waste Volume (cubic feet) | Mass (pounds) |
|---|---|----------------------|------------------------------|------------------|
| Low-Level Radioactive Waste (near-surface disposal) | EnergySolutions Containerized | A | 122,218 | 7,169,509 |
| | EnergySolutions Bulk | A | 75,048 | 4,661,403 |
| | Future LLRW Disposal Facility (Proxy) | B | 1,992 | 228,038 |
| | Future LLRW Disposal Facility (Proxy) | C | 898 | 67,710 |
| Greater than Class C (geologic repository) | Spent Fuel Equivalent | GTCC | 1,160 | 225,765 |
| | | | | |
| Total ^[2] | | | 201,315 | 12,352,425 |
| | | | | |
| Processed/Conditioned (off-site recycling center) | Recycling Vendors | A | 288,203 | 12,125,960 |
| | | | | |
| Scrap Metal | | | | 46,246,000 |

^[1] Waste is classified according to the requirements as delineated in Title 10 CFR, Part 61.55

^[2] Columns may not add due to rounding

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Section 5, Page 11 of 12****TABLE 5.7
SCENARIO 7: SAFSTOR WITH 100 YEAR DFS
DECOMMISSIONING WASTE SUMMARY**

| Waste | Cost Basis | Class ^[1] | Waste Volume (cubic feet) | Mass (pounds) |
|---|---|----------------------|------------------------------|------------------|
| Low-Level Radioactive Waste (near-surface disposal) | EnergySolutions Containerized | A | 48,784 | 3,106,599 |
| | EnergySolutions Bulk | A | 104,397 | 5,910,437 |
| | Future LLRW Disposal Facility (Proxy) | B | 1,628 | 142,266 |
| | Future LLRW Disposal Facility (Proxy) | C | 600 | 60,128 |
| Greater than Class C (geologic repository) | Spent Fuel Equivalent | GTCC | 1,160 | 225,765 |
| | | | | |
| Total ^[2] | | | 156,569 | 9,445,194 |
| | | | | |
| Processed/Conditioned (off-site recycling center) | Recycling Vendors | A | 340,180 | 14,286,120 |
| | | | | |
| Scrap Metal | | | | 46,246,000 |

^[1] Waste is classified according to the requirements as delineated in Title 10 CFR, Part 61.55

^[2] Columns may not add due to rounding

6. RESULTS

This report presents estimates of the cost to decommission Monticello for the selected decommissioning scenarios following the cessation of plant operations. The estimates are based on numerous fundamental assumptions, including regulatory requirements, project contingencies, low-level radioactive waste disposal practices, high-level radioactive waste management options, and site restoration requirements. While not an engineering study, the estimates provide Xcel Energy with sufficient information to assess their financial obligations, as they pertain to the eventual decommissioning of the nuclear station.

The decommissioning scenarios assume continued operation of the station's spent fuel pool for a minimum of four years following the cessation of operations for continued cooling of the assemblies. The existing ISFSI is expanded to accommodate the spent fuel, once sufficiently cooled, until such time that the DOE can complete the transfer of the assemblies to its repository.

Using Scenario 2 as the base case, the cost projected to promptly decommission the station, restore the site, and manage the spent fuel is estimated to be \$1.613 billion (2020 dollars). The majority of this cost (approximately 48.1%) is associated with the physical decontamination and dismantling of the nuclear plant so that the operating license can be terminated. Another 47.3% is associated with the management, interim storage, and eventual transfer of the spent fuel. The remaining 4.6% is for the demolition of the designated structures and limited restoration of the site.

The primary cost contributors, identified in Tables 6.1 through 6.8, are either labor-related or associated with the management and disposition of the spent fuel or radioactive waste. Program management (including security) is the largest single contributor to the overall cost. The magnitude of the expense is a function of both the size of the organization required to manage the decommissioning, as well as the duration of the program. It is assumed, for purposes of this analysis, that Xcel Energy will hire a contractor to manage the decommissioning labor force. The size and composition of the management organizations varies with the decommissioning phase and associated site activities. However, once the operating license is amended or terminated, the staff is substantially reduced for the conventional demolition and restoration of the site, and the long-term care of the spent fuel (for the DECON alternative).

As described in this report, the spent fuel pool will remain operational for a minimum of four years following the cessation of operations. The pool will be isolated and an independent spent fuel island created. This will allow

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decommissioning operations to proceed in and around the pool areas. Over the four year period, the spent fuel will be packaged into transportable canisters for future loading into a DOE-provided transport cask or relocation to the ISFSI. The canisters will be stored in horizontal storage casks at the ISFSI until the DOE is able to receive them. Dry storage of the fuel provides additional flexibility in the event the DOE is not able to meet the current timetable for completing the transfer of assemblies to an off-site facility and minimizes the associated caretaking expenses.

The cost for waste disposal includes only those costs associated with the controlled disposition of the low-level radioactive waste generated from decontamination and dismantling activities, including plant equipment and components, structural material, filters, resins and dry-active waste. As described in Section 5, disposition of the majority of the low-level radioactive material requiring controlled disposal is at the EnergySolutions facility, with higher-activity waste sent to the WCS facility. Highly activated components, requiring additional isolation from the environment (GTCC), are packaged for geologic disposal. The cost of geologic disposal is based upon a cost equivalent for spent fuel.

A significant portion of the metallic waste is designated for additional processing and treatment at an off-site facility. Processing reduces the volume of material requiring controlled disposal through such techniques and processes as survey and sorting, decontamination, and volume reduction. The material that cannot be unconditionally released is packaged for controlled disposal at one of the currently operating facilities. The cost identified in the summary tables for processing is all-inclusive, incorporating the ultimate disposition of the material.

Removal costs reflect the labor-intensive nature of the decommissioning process, as well as the management controls required to ensure a safe and successful program. Decontamination and packaging costs also have a large labor component that is based upon prevailing wages. Non-radiological demolition is a natural extension of the decommissioning process. The methods employed in decontamination and dismantling are generally destructive and indiscriminate in inflicting collateral damage. With a work force mobilized to support decommissioning operations, non-radiological demolition can be an integrated activity and a logical expansion of the work being performed in the process of terminating the operating license.

The reported cost for transport includes the tariffs and surcharges associated with moving large components and/or overweight shielded casks overland, as well as the general expense, e.g., labor and fuel, of transporting material to the destinations identified in this report. For purposes of this analysis, material is moved overland by truck.

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Decontamination is used to reduce the plant's radiation fields and minimize worker exposure. Slightly contaminated material or material located within a contaminated area is sent to an off-site processing center, i.e., this analysis does not assume that contaminated plant components and equipment can be decontaminated for uncontrolled release in-situ. Centralized processing centers have proven to be a more economical means of handling the large volumes of material produced in the dismantling of a nuclear plant.

License termination survey costs are associated with the labor intensive and complex activity of verifying that contamination has been removed from the site to the levels specified by the regulating agency. This process involves a systematic survey of all remaining plant surface areas and surrounding environs, sampling, isotopic analysis, and documentation of the findings. The status of any plant components and materials not removed in the decommissioning process will also require confirmation and will add to the expense of surveying the facilities alone.

The remaining costs include allocations for heavy equipment and temporary services, as well as for other expenses such as regulatory fees and the premiums for nuclear insurance. While site operating costs are greatly reduced following the final cessation of plant operations, certain administrative functions do need to be maintained either at a basic functional or regulatory level.

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TABLE 6.1
SCENARIO 1: DECON WITH 42 YEAR DFS
DECOMMISSIONING COST ELEMENTS
(thousands of 2020 dollars)

| Cost Element | Total | Percentage |
|--|------------------|---------------|
| Decontamination | 24,330 | 1.7% |
| Removal | 124,923 | 8.9% |
| Packaging | 26,543 | 1.9% |
| Transportation | 14,145 | 1.0% |
| Waste Disposal | 114,148 | 8.1% |
| Off-site Waste Processing | 57,444 | 4.1% |
| Program Management ^[1] | 291,793 | 20.8% |
| Security | 300,359 | 21.4% |
| Spent Fuel Pool Isolation | 14,576 | 1.0% |
| Spent Fuel Storage (Direct Costs) ^[2] | 243,342 | 17.3% |
| Insurance and Regulatory Fees | 39,755 | 2.8% |
| Energy | 10,030 | 0.7% |
| Characterization and Licensing Surveys | 23,012 | 1.6% |
| Property Taxes | 55,377 | 3.9% |
| Miscellaneous Equipment | 7,411 | 0.5% |
| Railroad Track Maintenance | 6,915 | 0.5% |
| Retention and Severance | 41,002 | 2.9% |
| Security Modifications | 10,000 | 0.7% |
| Total ^[3] | 1,405,104 | 100.0% |

| Cost Element | Total | Percentage |
|-----------------------------|------------------|---------------|
| NRC License Termination | 776,139 | 55.2% |
| Spent Fuel Management | 555,579 | 39.5% |
| Site Restoration | 73,386 | 5.2% |
| Total ^[3] | 1,405,104 | 100.0% |

^[1] Includes engineering

^[2] Includes costs for the dry storage system components, spent fuel loading and transfer, spent fuel pool O&M and EP fees, but excludes program management costs (staffing), security and other related costs

^[3] Columns may not add due to rounding

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TABLE 6.2
SCENARIO 2: DECON WITH 60 YEAR DFS
DECOMMISSIONING COST ELEMENTS
(thousands of 2020 dollars)

| Cost Element | Total | Percentage |
|--|------------------|---------------|
| Decontamination | 24,330 | 1.5% |
| Removal | 124,923 | 7.7% |
| Packaging | 26,543 | 1.6% |
| Transportation | 14,145 | 0.9% |
| Waste Disposal | 114,148 | 7.1% |
| Off-site Waste Processing | 57,444 | 3.6% |
| Program Management ^[1] | 317,534 | 19.7% |
| Security | 389,439 | 24.1% |
| Spent Fuel Pool Isolation | 14,576 | 0.9% |
| Spent Fuel Storage (Direct Costs) ^[2] | 301,663 | 18.7% |
| Insurance and Regulatory Fees | 53,689 | 3.3% |
| Energy | 10,030 | 0.6% |
| Characterization and Licensing Surveys | 23,012 | 1.4% |
| Property Taxes | 73,368 | 4.5% |
| Miscellaneous Equipment | 7,411 | 0.5% |
| Railroad Track Maintenance | 9,505 | 0.6% |
| Retention and Severance | 41,002 | 2.5% |
| Security Modifications | 10,000 | 0.6% |
| Total ^[3] | 1,612,762 | 100.0% |

| Cost Element | Total | Percentage |
|-----------------------------|------------------|---------------|
| NRC License Termination | 776,139 | 48.1% |
| Spent Fuel Management | 763,237 | 47.3% |
| Site Restoration | 73,386 | 4.6% |
| Total ^[3] | 1,612,762 | 100.0% |

^[1] Includes engineering

^[2] Includes costs for the dry storage system components, spent fuel loading and transfer, spent fuel pool O&M and EP fees, but excludes program management costs (staffing), security and other related costs

^[3] Columns may not add due to rounding

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TABLE 6.3
SCENARIO 3: DECON WITH 100 YEAR DFS
DECOMMISSIONING COST ELEMENTS
(thousands of 2020 dollars)

| Cost Element | Total | Percentage |
|--|------------------|---------------|
| Decontamination | 24,330 | 0.9% |
| Removal | 125,011 | 4.7% |
| Packaging | 26,543 | 1.0% |
| Transportation | 14,145 | 0.5% |
| Waste Disposal | 114,148 | 4.3% |
| Off-site Waste Processing | 57,444 | 2.2% |
| Program Management ^[1] | 502,435 | 19.0% |
| Security | 587,397 | 22.2% |
| Spent Fuel Pool Isolation | 14,576 | 0.6% |
| Spent Fuel Storage (Direct Costs) ^[2] | 875,124 | 33.1% |
| Insurance and Regulatory Fees | 84,655 | 3.2% |
| Energy | 10,030 | 0.4% |
| Characterization and Licensing Surveys | 23,012 | 0.9% |
| Property Taxes | 113,348 | 4.3% |
| Miscellaneous Equipment | 7,411 | 0.3% |
| Railroad Track Maintenance | 15,260 | 0.6% |
| Retention and Severance | 41,002 | 1.5% |
| Security Modifications | 10,000 | 0.4% |
| Total ^[3] | 2,645,871 | 100.0% |

| Cost Element | Total | Percentage |
|-----------------------------|------------------|---------------|
| NRC License Termination | 776,228 | 29.3% |
| Spent Fuel Management | 1,795,906 | 67.9% |
| Site Restoration | 73,737 | 2.8% |
| Total ^[3] | 2,645,871 | 100.0% |

^[1] Includes engineering

^[2] Includes costs for the dry storage system components, spent fuel loading and transfer, spent fuel pool O&M and EP fees, but excludes program management costs (staffing), security and other related costs

^[3] Columns may not add due to rounding

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TABLE 6.4
SCENARIO 4: DECON WITH 200 YEAR DFS
DECOMMISSIONING COST ELEMENTS
(thousands of 2020 dollars)

| Cost Element | Total | Percentage |
|--|------------------|---------------|
| Decontamination | 24,330 | 0.5% |
| Removal | 125,011 | 2.7% |
| Packaging | 26,543 | 0.6% |
| Transportation | 14,145 | 0.3% |
| Waste Disposal | 114,148 | 2.4% |
| Off-site Waste Processing | 57,444 | 1.2% |
| Program Management ^[1] | 782,364 | 16.7% |
| Security | 1,082,311 | 23.0% |
| Spent Fuel Pool Isolation | 14,576 | 0.3% |
| Spent Fuel Storage (Direct Costs) ^[2] | 1,961,162 | 41.7% |
| Insurance and Regulatory Fees | 162,073 | 3.4% |
| Energy | 10,030 | 0.2% |
| Characterization and Licensing Surveys | 23,012 | 0.5% |
| Property Taxes | 213,298 | 4.5% |
| Miscellaneous Equipment | 7,411 | 0.2% |
| Railroad Track Maintenance | 29,650 | 0.6% |
| Retention and Severance | 41,002 | 0.9% |
| Security Modifications | 10,000 | 0.2% |
| Total ^[3] | 4,698,509 | 100.0% |

| Cost Element | Total | Percentage |
|-----------------------------|------------------|---------------|
| NRC License Termination | 776,228 | 16.5% |
| Spent Fuel Management | 3,848,543 | 81.9% |
| Site Restoration | 73,737 | 1.6% |
| Total ^[3] | 4,698,509 | 100.0% |

^[1] Includes engineering

^[2] Includes costs for the dry storage system components, spent fuel loading and transfer, spent fuel pool O&M and EP fees, but excludes program management costs (staffing), security and other related costs

^[3] Columns may not add due to rounding

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TABLE 6.5
SCENARIO 5: SAFSTOR WITH 42 YEAR DFS
DECOMMISSIONING COST ELEMENTS
(thousands of 2020 dollars)

| Cost Element | Total | Percentage |
|--|------------------|---------------|
| Decontamination | 30,303 | 1.7% |
| Removal | 130,385 | 7.2% |
| Packaging | 17,375 | 1.0% |
| Transportation | 10,222 | 0.6% |
| Waste Disposal | 82,277 | 4.6% |
| Off-site Waste Processing | 67,679 | 3.8% |
| Program Management ^[1] | 415,951 | 23.1% |
| Security | 379,377 | 21.1% |
| Spent Fuel Pool Isolation | 14,576 | 0.8% |
| Spent Fuel Storage (Direct Costs) ^[2] | 233,722 | 13.0% |
| Insurance and Regulatory Fees | 61,212 | 3.4% |
| Energy | 23,983 | 1.3% |
| Characterization and Licensing Surveys | 24,381 | 1.4% |
| Property Taxes | 227,954 | 12.7% |
| Miscellaneous Equipment | 21,371 | 1.2% |
| Railroad Track Maintenance | 9,258 | 0.5% |
| Retention and Severance | 41,002 | 2.3% |
| Security Modifications | 10,000 | 0.6% |
| Total ^[3] | 1,801,028 | 100.0% |

| Cost Element | Total | Percentage |
|-----------------------------|------------------|---------------|
| NRC License Termination | 1,258,686 | 69.9% |
| Spent Fuel Management | 479,749 | 26.6% |
| Site Restoration | 62,593 | 3.5% |
| Total ^[3] | 1,801,028 | 100.0% |

^[1] Includes engineering

^[2] Includes costs for the dry storage system components, spent fuel loading and transfer, spent fuel pool O&M and EP fees, but excludes program management costs (staffing), security and other related costs

^[3] Columns may not add due to rounding

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TABLE 6.6
SCENARIO 6: SAFSTOR WITH 60 YEAR DFS
DECOMMISSIONING COST ELEMENTS
(thousands of 2020 dollars)

| Cost Element | Total | Percentage |
|--|------------------|---------------|
| Decontamination | 30,303 | 1.6% |
| Removal | 130,503 | 6.7% |
| Packaging | 17,378 | 0.9% |
| Transportation | 10,223 | 0.5% |
| Waste Disposal | 82,289 | 4.2% |
| Off-site Waste Processing | 67,679 | 3.5% |
| Program Management ^[1] | 433,069 | 22.3% |
| Security | 431,859 | 22.2% |
| Spent Fuel Pool Isolation | 14,576 | 0.8% |
| Spent Fuel Storage (Direct Costs) ^[2] | 289,013 | 14.9% |
| Insurance and Regulatory Fees | 66,507 | 3.4% |
| Energy | 23,983 | 1.2% |
| Characterization and Licensing Surveys | 24,381 | 1.3% |
| Property Taxes | 238,521 | 12.3% |
| Miscellaneous Equipment | 21,371 | 1.1% |
| Railroad Track Maintenance | 9,258 | 0.5% |
| Retention and Severance | 41,002 | 2.1% |
| Security Modifications | 10,000 | 0.5% |
| Total ^[3] | 1,941,915 | 100.0% |

| Cost Element | Total | Percentage |
|-----------------------------|------------------|---------------|
| NRC License Termination | 1,250,097 | 64.4% |
| Spent Fuel Management | 629,040 | 32.4% |
| Site Restoration | 62,778 | 3.2% |
| Total ^[3] | 1,941,915 | 100.0% |

^[1] Includes engineering

^[2] Includes costs for the dry storage system components, spent fuel loading and transfer, spent fuel pool O&M and EP fees, but excludes program management costs (staffing), security and other related costs

^[3] Columns may not add due to rounding

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TABLE 6.7
SCENARIO 7: SAFSTOR WITH 100 YEAR DFS
DECOMMISSIONING COST ELEMENTS
(thousands of 2020 dollars)

| Cost Element | Total | Percentage |
|--|------------------|---------------|
| Decontamination | 29,939 | 1.0% |
| Removal | 130,623 | 4.5% |
| Packaging | 22,597 | 0.8% |
| Transportation | 10,222 | 0.4% |
| Waste Disposal | 82,285 | 2.8% |
| Off-site Waste Processing | 67,679 | 2.3% |
| Program Management ^[1] | 544,148 | 18.8% |
| Security | 611,726 | 21.2% |
| Spent Fuel Pool Isolation | 14,576 | 0.5% |
| Spent Fuel Storage (Direct Costs) ^[2] | 863,002 | 29.9% |
| Insurance and Regulatory Fees | 97,864 | 3.4% |
| Energy | 24,005 | 0.8% |
| Characterization and Licensing Surveys | 24,381 | 0.8% |
| Property Taxes | 278,126 | 9.6% |
| Miscellaneous Equipment | 21,371 | 0.7% |
| Railroad Track Maintenance | 14,886 | 0.5% |
| Retention and Severance | 41,002 | 1.4% |
| Security Modifications | 10,000 | 0.3% |
| Total ^[3] | 2,888,431 | 100.0% |

| Cost Element | Total | Percentage |
|-----------------------------|------------------|---------------|
| NRC License Termination | 1,248,652 | 43.2% |
| Spent Fuel Management | 1,580,426 | 54.7% |
| Site Restoration | 59,354 | 2.1% |
| Total ^[3] | 2,888,431 | 100.0% |

^[1] Includes engineering costs

^[2] Includes costs for the dry storage system components, spent fuel loading and transfer, spent fuel pool O&M and EP fees, but excludes program management costs (staffing), security and other related costs

^[3] Columns may not add due to rounding

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TABLE 6.8
SCENARIO 8: SAFSTOR WITH 200 YEAR DFS
DECOMMISSIONING COST ELEMENTS
(thousands of 2020 dollars)

| Cost Element | Total | Percentage |
|--|------------------|---------------|
| Decontamination | 29,939 | 0.6% |
| Removal | 130,623 | 2.7% |
| Packaging | 22,597 | 0.5% |
| Transportation | 10,222 | 0.2% |
| Waste Disposal | 82,285 | 1.7% |
| Off-site Waste Processing | 67,679 | 1.4% |
| Program Management ^[1] | 824,077 | 16.8% |
| Security | 1,061,840 | 21.7% |
| Spent Fuel Pool Isolation | 14,576 | 0.3% |
| Spent Fuel Storage (Direct Costs) ^[2] | 1,949,073 | 39.8% |
| Insurance and Regulatory Fees | 175,282 | 3.6% |
| Energy | 24,005 | 0.5% |
| Characterization and Licensing Surveys | 24,381 | 0.5% |
| Property Taxes | 378,076 | 7.7% |
| Miscellaneous Equipment | 21,371 | 0.4% |
| Railroad Track Maintenance | 29,275 | 0.6% |
| Retention and Severance | 41,002 | 0.8% |
| Security Modifications | 10,000 | 0.2% |
| Total ^[3] | 4,896,303 | 100.0% |

| Cost Element | Total | Percentage |
|-----------------------------|------------------|---------------|
| NRC License Termination | 1,248,733 | 25.5% |
| Spent Fuel Management | 3,588,216 | 73.3% |
| Site Restoration | 59,354 | 1.2% |
| Total ^[3] | 4,896,303 | 100.0% |

^[1] Includes engineering costs

^[2] Includes costs for the dry storage system components, spent fuel loading and transfer, spent fuel pool O&M and EP fees, but excludes program management costs (staffing), security and other related costs

^[3] Columns may not add due to rounding

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7. REFERENCES

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APPENDIX A

UNIT COST FACTOR DEVELOPMENT

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UNIT COST FACTOR DEVELOPMENT

Example: Unit Factor for Removal of Contaminated Heat Exchanger < 3,000 lbs.

1. SCOPE

Heat exchangers weighing < 3,000 lbs. will be removed in one piece using a crane or small hoist. They will be disconnected from the inlet and outlet piping. The heat exchanger will be sent to the waste processing area.

2. CALCULATIONS

| Act ID | Activity Description | Activity Duration (minutes) | Critical Duration (minutes)* |
|---|---|-----------------------------|------------------------------|
| a | Remove insulation | 60 | (b) |
| b | Mount pipe cutters | 60 | 60 |
| c | Install contamination controls | 20 | (b) |
| d | Disconnect inlet and outlet lines | 60 | 60 |
| e | Cap openings | 20 | (d) |
| f | Rig for removal | 30 | 30 |
| g | Unbolt from mounts | 30 | 30 |
| h | Remove contamination controls | 15 | 15 |
| i | Remove, wrap, send to waste processing area | <u>60</u> | <u>60</u> |
| Totals (Activity/Critical) | | 355 | 255 |
| Duration adjustment(s): | | | |
| + Respiratory protection adjustment (50 of critical duration) | | | 128 |
| + Radiation/ALARA adjustment (37.1 of critical duration) | | | <u>95</u> |
| Adjusted work duration | | | 478 |
| + Protective clothing adjustment (30 of adjusted duration) | | | <u>143</u> |
| Productive work duration | | | 621 |
| + Work break adjustment (8.33 of productive duration) | | | <u>52</u> |
| Total work duration (minutes) | | | 673 |

***** Total duration = 11.217 hr *****

* alpha designators indicate activities that can be performed in parallel

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(continued)****3. LABOR REQUIRED**

| Crew | Number | Duration (hours) | Rate (\$/hr) | Cost |
|---------------------------|--------|---------------------|-----------------|-----------------|
| Laborers | 3.00 | 11.217 | \$61.19 | \$2,059.10 |
| Craftsmen | 2.00 | 11.217 | \$76.95 | \$1,726.30 |
| Foreman | 1.00 | 11.217 | \$80.53 | \$903.30 |
| General Foreman | 0.25 | 11.217 | \$82.80 | \$232.19 |
| Fire Watch | 0.05 | 11.217 | \$61.19 | \$34.32 |
| Health Physics Technician | 1.00 | 11.217 | \$53.89 | <u>\$604.48</u> |
| Total Labor Cost | | | | \$5,559.69 |

4. EQUIPMENT & CONSUMABLES COSTS

| | |
|--|---|
| Equipment Costs | none |
| Consumables/Materials Costs | |
| <ul style="list-style-type: none"> • Universal Sorbent 50 @ \$0.63 sq ft ^{1} • Tarpaulins (oil resistant/fire retardant) 50 @ \$0.47/sq ft ^{2} • Gas torch consumables 1 @ \$20.79/hr x 1 hr ^{3} | <p>\$31.50</p> <p>\$23.50</p> <p><u>\$20.79</u></p> |
| Subtotal cost of equipment and materials | \$75.79 |
| Overhead & profit on equipment and materials @ 16.88% | <u>\$12.79</u> |
| Total costs, equipment & material | \$88.58 |

TOTAL COST:

| | |
|--|-------------------|
| Removal of contaminated heat exchanger <3000 pounds: | \$5,648.27 |
| Total labor cost: | \$5,559.69 |
| Total equipment/material costs: | \$88.58 |
| Total craft labor man-hours required per unit: | 81.88 |

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5. NOTES AND REFERENCES

- Work difficulty factors were developed in conjunction with the Atomic Industrial Forum's (now NEI) program to standardize nuclear decommissioning cost estimates and are delineated in Volume 1, Chapter 5 of the "Guidelines for Producing Commercial Nuclear Power Plant Decommissioning Cost Estimates," AIF/NESP-036, May 1986.
- References for equipment & consumables costs:
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- Material and consumable costs were adjusted using the regional indices for Minneapolis, Minnesota.

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APPENDIX B

**UNIT COST FACTOR LISTING
(DECON: Power Block Structures Only)**

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Appendix B, Page 2 of 7****APPENDIX B****UNIT COST FACTOR LISTING
(Power Block Structures Only)**

| Unit Cost Factor | Cost/Unit |
|---|------------------|
| Removal of clean instrument and sampling tubing, \$/linear foot | 0.66 |
| Removal of clean pipe 0.25 to 2 inches diameter, \$/linear foot | 7.12 |
| Removal of clean pipe >2 to 4 inches diameter, \$/linear foot | 10.10 |
| Removal of clean pipe >4 to 8 inches diameter, \$/linear foot | 19.57 |
| Removal of clean pipe >8 to 14 inches diameter, \$/linear foot | 37.90 |
| Removal of clean pipe >14 to 20 inches diameter, \$/linear foot | 49.31 |
| Removal of clean pipe >20 to 36 inches diameter, \$/linear foot | 72.54 |
| Removal of clean pipe >36 inches diameter, \$/linear foot | 86.18 |
| Removal of clean valve >2 to 4 inches | 129.74 |
| Removal of clean valve >4 to 8 inches | 195.68 |
| Removal of clean valve >8 to 14 inches | 379.05 |
| Removal of clean valve >14 to 20 inches | 493.07 |
| Removal of clean valve >20 to 36 inches | 725.39 |
| Removal of clean valve >36 inches | 861.75 |
| Removal of clean pipe hanger for small bore piping | 44.86 |
| Removal of clean pipe hanger for large bore piping | 160.35 |
| Removal of clean pump, <300 pound | 330.70 |
| Removal of clean pump, 300-1000 pound | 912.70 |
| Removal of clean pump, 1000-10,000 pound | 3,609.83 |
| Removal of clean pump, >10,000 pound | 6,983.56 |
| Removal of clean pump motor, 300-1000 pound | 381.49 |
| Removal of clean pump motor, 1000-10,000 pound | 1,499.79 |
| Removal of clean pump motor, >10,000 pound | 3,374.52 |
| Removal of clean heat exchanger <3000 pound | 1,938.45 |
| Removal of clean heat exchanger >3000 pound | 4,882.77 |
| Removal of clean feedwater heater/deaerator | 13,764.03 |
| Removal of clean moisture separator/reheater | 28,295.13 |
| Removal of clean tank, <300 gallons | 425.32 |
| Removal of clean tank, 300-3000 gallon | 1,339.93 |
| Removal of clean tank, >3000 gallons, \$/square foot surface area | 11.21 |

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(Power Block Structures Only)**

| Unit Cost Factor | Cost/Unit |
|--|------------------|
| Removal of clean electrical equipment, <300 pound | 179.21 |
| Removal of clean electrical equipment, 300-1000 pound | 621.10 |
| Removal of clean electrical equipment, 1000-10,000 pound | 1,242.20 |
| Removal of clean electrical equipment, >10,000 pound | 2,944.57 |
| Removal of clean electrical transformer < 30 tons | 2,044.97 |
| Removal of clean electrical transformer > 30 tons | 5,889.16 |
| Removal of clean standby diesel generator, <100 kW | 2,088.76 |
| Removal of clean standby diesel generator, 100 kW to 1 MW | 4,662.25 |
| Removal of clean standby diesel generator, >1 MW | 9,651.80 |
| Removal of clean electrical cable tray, \$/linear foot | 16.85 |
| Removal of clean electrical conduit, \$/linear foot | 7.36 |
| Removal of clean mechanical equipment, <300 pound | 179.21 |
| Removal of clean mechanical equipment, 300-1000 pound | 621.10 |
| Removal of clean mechanical equipment, 1000-10,000 pound | 1,242.20 |
| Removal of clean mechanical equipment, >10,000 pound | 2,944.57 |
| Removal of clean HVAC equipment, <300 pound | 216.70 |
| Removal of clean HVAC equipment, 300-1000 pound | 746.29 |
| Removal of clean HVAC equipment, 1000-10,000 pound | 1,487.38 |
| Removal of clean HVAC equipment, >10,000 pound | 2,944.57 |
| Removal of clean HVAC ductwork, \$/pound | 0.70 |
| Removal of contaminated instrument and sampling tubing, \$/linear foot | 1.95 |
| Removal of contaminated pipe 0.25 to 2 inches diameter, \$/linear foot | 27.83 |
| Removal of contaminated pipe >2 to 4 inches diameter, \$/linear foot | 47.82 |
| Removal of contaminated pipe >4 to 8 inches diameter, \$/linear foot | 74.96 |
| Removal of contaminated pipe >8 to 14 inches diameter, \$/linear foot | 148.03 |
| Removal of contaminated pipe >14 to 20 inches diameter, \$/linear foot | 177.89 |
| Removal of contaminated pipe >20 to 36 inches diameter, \$/linear foot | 246.18 |
| Removal of contaminated pipe >36 inches diameter, \$/linear foot | 290.94 |
| Removal of contaminated valve >2 to 4 inches | 566.42 |
| Removal of contaminated valve >4 to 8 inches | 683.47 |

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(Power Block Structures Only)**

| Unit Cost Factor | Cost/Unit |
|---|------------------|
| Removal of contaminated valve >8 to 14 inches | 1,416.07 |
| Removal of contaminated valve >14 to 20 inches | 1,800.35 |
| Removal of contaminated valve >20 to 36 inches | 2,397.55 |
| Removal of contaminated valve >36 inches | 2,845.15 |
| Removal of contaminated pipe hanger for small bore piping | 185.78 |
| Removal of contaminated pipe hanger for large bore piping | 626.83 |
| Removal of contaminated pump, <300 pound | 1,220.05 |
| Removal of contaminated pump, 300-1000 pound | 2,838.23 |
| Removal of contaminated pump, 1000-10,000 pound | 9,385.29 |
| Removal of contaminated pump, >10,000 pound | 22,861.69 |
| Removal of contaminated pump motor, 300-1000 pound | 1,207.33 |
| Removal of contaminated pump motor, 1000-10,000 pound | 3,818.35 |
| Removal of contaminated pump motor, >10,000 pound | 8,572.65 |
| Removal of contaminated heat exchanger <3000 pound | 5,648.27 |
| Removal of contaminated heat exchanger >3000 pound | 16,376.90 |
| Removal of contaminated feedwater heater/deaerator | 40,348.66 |
| Removal of contaminated moisture separator/reheater | 88,508.97 |
| Removal of contaminated tank, <300 gallons | 2,028.12 |
| Removal of contaminated tank, >300 gallons, \$/square foot | 39.80 |
| Removal of contaminated electrical equipment, <300 pound | 945.59 |
| Removal of contaminated electrical equipment, 300-1000 pound | 2,314.13 |
| Removal of contaminated electrical equipment, 1000-10,000 pound | 4,457.30 |
| Removal of contaminated electrical equipment, >10,000 pound | 8,759.01 |
| Removal of contaminated electrical cable tray, \$/linear foot | 45.76 |
| Removal of contaminated electrical conduit, \$/linear foot | 22.38 |
| Removal of contaminated mechanical equipment, <300 pound | 1,051.94 |
| Removal of contaminated mechanical equipment, 300-1000 pound | 2,555.55 |
| Removal of contaminated mechanical equipment, 1000-10,000 pound | 4,914.24 |
| Removal of contaminated mechanical equipment, >10,000 pound | 8,759.01 |
| Removal of contaminated HVAC equipment, <300 pound | 1,051.94 |

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(Power Block Structures Only)**

| Unit Cost Factor | Cost/Unit |
|---|------------------|
| Removal of contaminated HVAC equipment, 300-1000 pound | 2,555.55 |
| Removal of contaminated HVAC equipment, 1000-10,000 pound | 4,914.24 |
| Removal of contaminated HVAC equipment, >10,000 pound | 8,759.01 |
| Removal of contaminated HVAC ductwork, \$/pound | 2.68 |
| Removal/plasma arc cut of contaminated thin metal components, \$/linear in. | 5.11 |
| Additional decontamination of surface by washing, \$/square foot | 10.44 |
| Additional decontamination of surfaces by hydrolasing, \$/square foot | 45.11 |
| Decontamination rig hook up and flush, \$/ 250 foot length | 8,866.81 |
| Chemical flush of components/systems, \$/gallon | 21.45 |
| Removal of clean standard reinforced concrete, \$/cubic yard | 79.60 |
| Removal of grade slab concrete, \$/cubic yard | 90.54 |
| Removal of clean concrete floors, \$/cubic yard | 462.42 |
| Removal of sections of clean concrete floors, \$/cubic yard | 1,391.16 |
| Removal of clean heavily rein concrete w/#9 rebar, \$/cubic yard | 115.00 |
| Removal of contaminated heavily rein concrete w/#9 rebar, \$/cubic yard | 2,709.95 |
| Removal of clean heavily rein concrete w/#18 rebar, \$/cubic yard | 155.86 |
| Removal of contaminated heavily rein concrete w/#18 rebar, \$/cubic yard | 3,585.12 |
| Removal heavily rein concrete w/#18 rebar & steel embedments, \$/cubic yard | 568.99 |
| Removal of below-grade suspended floors, \$/cubic yard | 218.59 |
| Removal of clean monolithic concrete structures, \$/cubic yard | 1,160.31 |
| Removal of contaminated monolithic concrete structures, \$/cubic yard | 2,697.57 |
| Removal of clean foundation concrete, \$/cubic yard | 910.72 |
| Removal of contaminated foundation concrete, \$/cubic yard | 2,512.94 |
| Explosive demolition of bulk concrete, \$/cubic yard | 61.21 |
| Removal of clean hollow masonry block wall, \$/cubic yard | 27.85 |
| Removal of contaminated hollow masonry block wall, \$/cubic yard | 72.42 |
| Removal of clean solid masonry block wall, \$/cubic yard | 27.85 |
| Removal of contaminated solid masonry block wall, \$/cubic yard | 72.42 |
| Backfill of below-grade voids, \$/cubic yard | 36.73 |
| Removal of subterranean tunnels/voids, \$/linear foot | 143.27 |

**Monticello Nuclear Generating Plant
Decommissioning Cost Analysis****Document X01-1775-002, Rev. 0
Appendix B, Page 6 of 7****APPENDIX B****UNIT COST FACTOR LISTING
(Power Block Structures Only)**

| Unit Cost Factor | Cost/Unit |
|---|------------------|
| Placement of concrete for below-grade voids, \$/cubic yard | 142.83 |
| Excavation of clean material, \$/cubic yard | 3.38 |
| Excavation of contaminated material, \$/cubic yard | 48.84 |
| Removal of clean concrete rubble (tipping fee included), \$/cubic yard | 28.05 |
| Removal of contaminated concrete rubble, \$/cubic yard | 30.62 |
| Removal of building by volume, \$/cubic foot | 0.35 |
| Removal of clean building metal siding, \$/square foot | 1.77 |
| Removal of contaminated building metal siding, \$/square foot | 5.62 |
| Removal of standard asphalt roofing, \$/square foot | 3.11 |
| Removal of transite panels, \$/square foot | 2.87 |
| Scarifying contaminated concrete surfaces (drill & spall), \$/square foot | 15.31 |
| Scabbling contaminated concrete floors, \$/square foot | 9.92 |
| Scabbling contaminated concrete walls, \$/square foot | 26.57 |
| Scabbling contaminated ceilings, \$/square foot | 91.52 |
| Scabbling structural steel, \$/square foot | 7.85 |
| Removal of clean overhead crane/monorail < 10 ton capacity | 863.54 |
| Removal of contaminated overhead crane/monorail < 10 ton capacity | 2,333.05 |
| Removal of clean overhead crane/monorail >10-50 ton capacity | 2,072.50 |
| Removal of contaminated overhead crane/monorail >10-50 ton capacity | 5,598.35 |
| Removal of polar crane > 50 ton capacity | 8,635.54 |
| Removal of gantry crane > 50 ton capacity | 32,881.12 |
| Removal of structural steel, \$/pound | 0.25 |
| Removal of clean steel floor grating, \$/square foot | 6.20 |
| Removal of contaminated steel floor grating, \$/square foot | 17.35 |
| Removal of clean free standing steel liner, \$/square foot | 16.80 |
| Removal of contaminated free standing steel liner, \$/square foot | 46.58 |
| Removal of clean concrete-anchored steel liner, \$/square foot | 8.40 |
| Removal of contaminated concrete-anchored steel liner, \$/square foot | 54.29 |
| Placement of scaffolding in clean areas, \$/square foot | 18.98 |
| Placement of scaffolding in contaminated areas, \$/square foot | 31.88 |

**Monticello Nuclear Generating Plant
Decommissioning Cost Analysis****Document X01-1775-002, Rev. 0
Appendix B, Page 7 of 7****APPENDIX B****UNIT COST FACTOR LISTING
(Power Block Structures Only)**

| Unit Cost Factor | Cost/Unit |
|--|------------------|
| Landscaping with topsoil, \$/acre | 25,605.38 |
| Cost of CPC B-88 LSA box & preparation for use | 2,185.34 |
| Cost of CPC B-25 LSA box & preparation for use | 1,785.69 |
| Cost of CPC B-12V 12 gauge LSA box & preparation for use | 1,711.39 |
| Cost of CPC B-144 LSA box & preparation for use | 10,802.17 |
| Cost of LSA drum & preparation for use | 260.76 |
| Cost of cask liner for CNSI 8 120A cask (resins) | 12,914.97 |
| Cost of cask liner for CNSI 8 120A cask (filters) | 9,404.01 |
| Decontamination of surfaces with vacuuming, \$/square foot | 1.04 |

***Monticello Nuclear Generating Plant
Decommissioning Cost Analysis***

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APPENDIX C

DETAILED COST ANALYSIS

SCENARIO 1: DECON with 42 Year DFS

**Monticello Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table C
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with DOE Pickup of Industry Fuel Starting in 2035
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|--|--|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| PERIOD 1a - Shutdown through Transition | | | | | | | | | | | | | | | | | | | | | |
| Period 1a Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| 1a.1.1 | Prepare preliminary decommissioning cost | - | - | - | - | - | - | 167 | 25 | 192 | 192 | - | - | - | - | - | - | - | - | - | 1,300 |
| 1a.1.2 | Notification of Cessation of Operations | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.3 | Remove fuel & source material | - | - | - | - | - | - | - | - | n/a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.4 | Notification of Permanent Defueling | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.5 | Deactivate plant systems & process waste | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.6 | Prepare and submit PSDAR | - | - | - | - | - | - | 257 | 39 | 296 | 296 | - | - | - | - | - | - | - | - | - | 2,000 |
| 1a.1.7 | Review plant dwgs & specs. | - | - | - | - | - | - | 591 | 89 | 680 | 680 | - | - | - | - | - | - | - | - | - | 4,600 |
| 1a.1.8 | Perform detailed rad survey | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.9 | Estimate by-product inventory | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| 1a.1.10 | End product description | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| 1a.1.11 | Detailed by-product inventory | - | - | - | - | - | - | 167 | 25 | 192 | 192 | - | - | - | - | - | - | - | - | - | 1,300 |
| 1a.1.12 | Define major work sequence | - | - | - | - | - | - | 964 | 145 | 1,108 | 1,108 | - | - | - | - | - | - | - | - | - | 7,500 |
| 1a.1.13 | Perform SER and EA | - | - | - | - | - | - | 398 | 60 | 458 | 458 | - | - | - | - | - | - | - | - | - | 3,100 |
| 1a.1.14 | Prepare/submit Defueled Technical Specifications | - | - | - | - | - | - | 964 | 145 | 1,108 | 1,108 | - | - | - | - | - | - | - | - | - | 7,500 |
| 1a.1.15 | Perform Site-Specific Cost Study | - | - | - | - | - | - | 643 | 96 | 739 | 739 | - | - | - | - | - | - | - | - | - | 5,000 |
| 1a.1.16 | Prepare/submit Irradiated Fuel Management Plan | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| Activity Specifications | | | | | | | | | | | | | | | | | | | | | |
| 1a.1.17.1 | Plant & temporary facilities | - | - | - | - | - | - | 632 | 95 | 727 | 654 | - | 73 | - | - | - | - | - | - | - | 4,920 |
| 1a.1.17.2 | Plant systems | - | - | - | - | - | - | 536 | 80 | 616 | 554 | - | 62 | - | - | - | - | - | - | - | 4,167 |
| 1a.1.17.3 | NSSS Decontamination Flush | - | - | - | - | - | - | 64 | 10 | 74 | 74 | - | - | - | - | - | - | - | - | - | 500 |
| 1a.1.17.4 | Reactor internals | - | - | - | - | - | - | 912 | 137 | 1,049 | 1,049 | - | - | - | - | - | - | - | - | - | 7,100 |
| 1a.1.17.5 | Reactor vessel | - | - | - | - | - | - | 835 | 125 | 961 | 961 | - | - | - | - | - | - | - | - | - | 6,500 |
| 1a.1.17.6 | Sacrificial shield | - | - | - | - | - | - | 64 | 10 | 74 | 74 | - | - | - | - | - | - | - | - | - | 500 |
| 1a.1.17.7 | Moisture separators/reheaters | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| 1a.1.17.8 | Reinforced concrete | - | - | - | - | - | - | 206 | 31 | 236 | 118 | - | 118 | - | - | - | - | - | - | - | 1,600 |
| 1a.1.17.9 | Main Turbine | - | - | - | - | - | - | 268 | 40 | 309 | 309 | - | - | - | - | - | - | - | - | - | 2,088 |
| 1a.1.17.10 | Main Condensers | - | - | - | - | - | - | 268 | 40 | 309 | 309 | - | - | - | - | - | - | - | - | - | 2,088 |
| 1a.1.17.11 | Pressure suppression structure | - | - | - | - | - | - | 257 | 39 | 296 | 296 | - | - | - | - | - | - | - | - | - | 2,000 |
| 1a.1.17.12 | Drywell | - | - | - | - | - | - | 206 | 31 | 236 | 236 | - | - | - | - | - | - | - | - | - | 1,600 |
| 1a.1.17.13 | Plant structures & buildings | - | - | - | - | - | - | 401 | 60 | 461 | 231 | - | 231 | - | - | - | - | - | - | - | 3,120 |
| 1a.1.17.14 | Waste management | - | - | - | - | - | - | 591 | 89 | 680 | 680 | - | - | - | - | - | - | - | - | - | 4,600 |
| 1a.1.17.15 | Facility & site closeout | - | - | - | - | - | - | 116 | 17 | 133 | 67 | - | 67 | - | - | - | - | - | - | - | 900 |
| 1a.1.17 | Total | - | - | - | - | - | - | 5,486 | 823 | 6,308 | 5,759 | - | 550 | - | - | - | - | - | - | - | 42,683 |
| Planning & Site Preparations | | | | | | | | | | | | | | | | | | | | | |
| 1a.1.18 | Prepare dismantling sequence | - | - | - | - | - | - | 308 | 46 | 355 | 355 | - | - | - | - | - | - | - | - | - | 2,400 |
| 1a.1.19 | Plant prep. & temp. svces | - | - | - | - | - | - | 3,500 | 525 | 4,025 | 4,025 | - | - | - | - | - | - | - | - | - | - |
| 1a.1.20 | Design water clean-up system | - | - | - | - | - | - | 180 | 27 | 207 | 207 | - | - | - | - | - | - | - | - | - | 1,400 |
| 1a.1.21 | Rigging/Cont. Cntrl Envlps/tooling/etc. | - | - | - | - | - | - | 2,400 | 360 | 2,760 | 2,760 | - | - | - | - | - | - | - | - | - | - |
| 1a.1.22 | Procure casks/liners & containers | - | - | - | - | - | - | 158 | 24 | 182 | 182 | - | - | - | - | - | - | - | - | - | 1,230 |
| 1a.1 | Subtotal Period 1a Activity Costs | - | - | - | - | - | - | 16,569 | 2,485 | 19,054 | 18,505 | - | 550 | - | - | - | - | - | - | - | 83,013 |
| Period 1a Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 1a.3.1 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 1,323 | 198 | 1,522 | - | 1,522 | - | - | - | - | - | - | - | - | - |
| 1a.3.2 | Retention and Severance | - | - | - | - | - | - | 9,892 | 1,484 | 11,376 | 11,376 | - | - | - | - | - | - | - | - | - | - |
| 1a.3 | Subtotal Period 1a Collateral Costs | - | - | - | - | - | - | 11,215 | 1,682 | 12,897 | 11,376 | 1,522 | - | - | - | - | - | - | - | - | - |
| Period 1a Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 1a.4.1 | Insurance | - | - | - | - | - | - | 2,328 | 233 | 2,561 | 2,561 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.2 | Property taxes | - | - | - | - | - | - | 3,570 | 357 | 3,927 | 3,927 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.3 | Health physics supplies | - | 614 | - | - | - | - | - | 153 | 767 | 767 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.4 | Heavy equipment rental | - | 753 | - | - | - | - | - | 113 | 866 | 866 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.5 | Disposal of DAW generated | - | - | 12 | 6 | - | 50 | - | 15 | 83 | 83 | - | - | 610 | - | - | - | - | - | 12,190 | 20 |
| 1a.4.6 | Plant energy budget | - | - | - | - | - | - | 1,817 | 272 | 2,089 | 2,089 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.7 | NRC Fees | - | - | - | - | - | - | 1,137 | 114 | 1,251 | 1,251 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.8 | Emergency Planning Fees | - | - | - | - | - | - | 3,428 | 343 | 3,770 | - | 3,770 | - | - | - | - | - | - | - | - | - |
| 1a.4.9 | Fixed Overhead | - | - | - | - | - | - | 2,616 | 392 | 3,009 | 3,009 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.10 | Spent Fuel Pool O&M | - | - | - | - | - | - | 845 | 127 | 971 | - | 971 | - | - | - | - | - | - | - | - | - |
| 1a.4.11 | ISFSI Operating Costs | - | - | - | - | - | - | 112 | 17 | 129 | - | 129 | - | - | - | - | - | - | - | - | - |
| 1a.4.12 | Railroad Track Maintenance | - | - | - | - | - | - | 125 | 19 | 144 | 144 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.13 | Security Staff Cost | - | - | - | - | - | - | 16,372 | 2,456 | 18,827 | 18,827 | - | - | - | - | - | - | - | - | - | 245,440 |
| 1a.4.14 | Utility Staff Cost | - | - | - | - | - | - | 27,285 | 4,093 | 31,378 | 31,378 | - | - | - | - | - | - | - | - | - | 422,240 |
| 1a.4 | Subtotal Period 1a Period-Dependent Costs | - | 1,367 | 12 | 6 | - | 50 | 59,634 | 8,703 | 69,772 | 64,902 | 4,870 | - | 610 | - | - | - | - | 12,190 | 20 | 667,680 |

**Monticello Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table C
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with DOE Pickup of Industry Fuel Starting in 2035
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|--|--------------|--------------|-----------------|-----------------|---------------------------|---------------------|----------------|-------------------|----------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| 1a.0 | TOTAL PERIOD 1a COST | - | 1,367 | 12 | 6 | - | 50 | 87,418 | 12,871 | 101,724 | 94,783 | 6,392 | 550 | - | 610 | - | - | - | 12,190 | 20 | 750,693 |
| PERIOD 1b - Decommissioning Preparations | | | | | | | | | | | | | | | | | | | | | |
| Period 1b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| Detailed Work Procedures | | | | | | | | | | | | | | | | | | | | | |
| 1b.1.1.1 | Plant systems | - | - | - | - | - | - | 608 | 91 | 700 | 630 | - | 70 | - | - | - | - | - | - | - | 4,733 |
| 1b.1.1.2 | NSSS Decontamination Flush | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| 1b.1.1.3 | Reactor internals | - | - | - | - | - | - | 514 | 77 | 591 | 591 | - | - | - | - | - | - | - | - | - | 4,000 |
| 1b.1.1.4 | Remaining buildings | - | - | - | - | - | - | 174 | 26 | 200 | 50 | - | 150 | - | - | - | - | - | - | - | 1,350 |
| 1b.1.1.5 | CRD housings & NIs | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| 1b.1.1.6 | Incore instrumentation | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| 1b.1.1.7 | Removal primary containment | - | - | - | - | - | - | 257 | 39 | 296 | 296 | - | - | - | - | - | - | - | - | - | 2,000 |
| 1b.1.1.8 | Reactor vessel | - | - | - | - | - | - | 467 | 70 | 537 | 537 | - | - | - | - | - | - | - | - | - | 3,630 |
| 1b.1.1.9 | Facility closeout | - | - | - | - | - | - | 154 | 23 | 177 | 89 | - | 89 | - | - | - | - | - | - | - | 1,200 |
| 1b.1.1.10 | Sacrificial shield | - | - | - | - | - | - | 154 | 23 | 177 | 177 | - | - | - | - | - | - | - | - | - | 1,200 |
| 1b.1.1.11 | Reinforced concrete | - | - | - | - | - | - | 129 | 19 | 148 | 74 | - | 74 | - | - | - | - | - | - | - | 1,000 |
| 1b.1.1.12 | Main Turbine | - | - | - | - | - | - | 267 | 40 | 307 | 307 | - | - | - | - | - | - | - | - | - | 2,080 |
| 1b.1.1.13 | Main Condensers | - | - | - | - | - | - | 268 | 40 | 309 | 309 | - | - | - | - | - | - | - | - | - | 2,088 |
| 1b.1.1.14 | Moisture separators & reheaters | - | - | - | - | - | - | 257 | 39 | 296 | 296 | - | - | - | - | - | - | - | - | - | 2,000 |
| 1b.1.1.15 | Radwaste building | - | - | - | - | - | - | 351 | 53 | 403 | 363 | - | 40 | - | - | - | - | - | - | - | 2,730 |
| 1b.1.1.16 | Reactor building | - | - | - | - | - | - | 351 | 53 | 403 | 363 | - | 40 | - | - | - | - | - | - | - | 2,730 |
| 1b.1.1 | Total | - | - | - | - | - | - | 4,336 | 650 | 4,987 | 4,524 | - | 463 | - | - | - | - | - | - | - | 33,741 |
| 1b.1.2 | Decon NSSS | 296 | - | - | - | - | - | - | 148 | 444 | 444 | - | - | - | - | - | - | - | - | 1,067 | - |
| 1b.1 | Subtotal Period 1b Activity Costs | 296 | - | - | - | - | - | 4,336 | 798 | 5,431 | 4,968 | - | 463 | - | - | - | - | - | - | 1,067 | 33,741 |
| Period 1b Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 1b.2.1 | Spent Fuel Pool Isolation | - | - | - | - | - | - | 12,675 | 1,901 | 14,576 | 14,576 | - | - | - | - | - | - | - | - | - | - |
| 1b.2.2 | Site Characterization | - | - | - | - | - | - | 5,930 | 1,779 | 7,708 | 7,708 | - | - | - | - | - | - | - | - | - | 30,500 |
| 1b.2.3 | Mixed & RCRA Waste | - | - | 28 | 29 | 14 | - | - | 9 | 80 | 80 | - | - | 43 | - | - | - | - | 5,253 | 161 | 10,852 |
| 1b.2 | Subtotal Period 1b Additional Costs | - | - | 28 | 29 | 14 | - | 18,605 | 3,689 | 22,365 | 22,365 | - | - | 43 | - | - | - | - | 5,253 | 30,661 | 10,852 |
| Period 1b Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 1b.3.1 | Decon equipment | 1,055 | - | - | - | - | - | - | 158 | 1,213 | 1,213 | - | - | - | - | - | - | - | - | - | - |
| 1b.3.2 | DOC staff relocation expenses | - | - | - | - | - | - | 1,264 | 190 | 1,454 | 1,454 | - | - | - | - | - | - | - | - | - | - |
| 1b.3.3 | Process decommissioning water waste | 38 | - | 25 | 45 | - | 102 | - | 53 | 263 | 263 | - | - | - | 233 | - | - | - | - | 13,991 | 45 |
| 1b.3.4 | Process decommissioning chemical flush waste | 1 | - | 24 | 77 | - | 1,526 | - | 396 | 2,024 | 2,024 | - | - | - | - | 231 | - | - | - | 24,599 | 43 |
| 1b.3.5 | Small tool allowance | - | 2 | - | - | - | - | - | 0 | 2 | 2 | - | - | - | - | - | - | - | - | - | - |
| 1b.3.6 | Pipe cutting equipment | - | 1,200 | - | - | - | - | - | 180 | 1,380 | 1,380 | - | - | - | - | - | - | - | - | - | - |
| 1b.3.7 | Decon rig | 2,104 | - | - | - | - | - | - | 316 | 2,419 | 2,419 | - | - | - | - | - | - | - | - | - | - |
| 1b.3.8 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 391 | 59 | 450 | - | 450 | - | - | - | - | - | - | - | - | - |
| 1b.3.9 | Retention and Severance | - | - | - | - | - | - | 6,335 | 950 | 7,285 | 7,285 | - | - | - | - | - | - | - | - | - | - |
| 1b.3 | Subtotal Period 1b Collateral Costs | 3,197 | 1,202 | 49 | 122 | - | 1,628 | 7,990 | 2,302 | 16,490 | 16,040 | 450 | - | - | 233 | 231 | - | - | 38,589 | 89 | - |
| Period 1b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 1b.4.1 | Decon supplies | 39 | - | - | - | - | - | - | 10 | 48 | 48 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.2 | Insurance | - | - | - | - | - | - | 1,161 | 116 | 1,277 | 1,277 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.3 | Property taxes | - | - | - | - | - | - | 1,709 | 171 | 1,880 | 1,880 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.4 | Health physics supplies | - | 344 | - | - | - | - | - | 86 | 430 | 430 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.5 | Heavy equipment rental | - | 375 | - | - | - | - | - | 56 | 432 | 432 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.6 | Disposal of DAW generated | - | - | 7 | 4 | - | 29 | - | 9 | 49 | 49 | - | - | - | 356 | - | - | - | 7,122 | 12 | - |
| 1b.4.7 | Plant energy budget | - | - | - | - | - | - | 1,812 | 272 | 2,083 | 2,083 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.8 | NRC Fees | - | - | - | - | - | - | 323 | 32 | 355 | 355 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.9 | Emergency Planning Fees | - | - | - | - | - | - | 1,416 | 142 | 1,557 | - | 1,557 | - | - | - | - | - | - | - | - | - |
| 1b.4.10 | Fixed Overhead | - | - | - | - | - | - | 1,305 | 196 | 1,500 | 1,500 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.11 | Spent Fuel Pool O&M | - | - | - | - | - | - | 421 | 63 | 484 | - | 484 | - | - | - | - | - | - | - | - | - |
| 1b.4.12 | ISFSI Operating Costs | - | - | - | - | - | - | 56 | 8 | 64 | - | 64 | - | - | - | - | - | - | - | - | - |
| 1b.4.13 | Railroad Track Maintenance | - | - | - | - | - | - | 62 | 9 | 72 | 72 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.14 | Security Staff Cost | - | - | - | - | - | - | 8,163 | 1,225 | 9,388 | 9,388 | - | - | - | - | - | - | - | - | - | 122,384 |
| 1b.4.15 | DOC Staff Cost | - | - | - | - | - | - | 5,846 | 877 | 6,723 | 6,723 | - | - | - | - | - | - | - | - | - | 63,266 |
| 1b.4.16 | Utility Staff Cost | - | - | - | - | - | - | 13,682 | 2,052 | 15,734 | 15,734 | - | - | - | - | - | - | - | - | - | 211,579 |
| 1b.4 | Subtotal Period 1b Period-Dependent Costs | 39 | 719 | 7 | 4 | - | 29 | 35,955 | 5,323 | 42,076 | 39,970 | 2,106 | - | - | 356 | - | - | - | 7,122 | 12 | 397,229 |
| 1b.0 | TOTAL PERIOD 1b COST | 3,531 | 1,921 | 84 | 154 | 14 | 1,657 | 66,886 | 12,113 | 86,361 | 83,343 | 2,556 | 463 | 43 | 589 | 231 | - | - | 50,964 | 31,828 | 441,822 |
| PERIOD 1 TOTALS | | 3,531 | 3,288 | 96 | 160 | 14 | 1,707 | 154,304 | 24,984 | 188,085 | 178,125 | 8,948 | 1,012 | 43 | 1,199 | 231 | - | - | 63,155 | 31,848 | 1,192,515 |

**Monticello Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table C
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with DOE Pickup of Industry Fuel Starting in 2035
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|--|--|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| PERIOD 2a - Large Component Removal | | | | | | | | | | | | | | | | | | | | | |
| Period 2a Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| Nuclear Steam Supply System Removal | | | | | | | | | | | | | | | | | | | | | |
| 2a.1.1.1 | Recirculation System Piping & Valves | 111 | 94 | 27 | 50 | - | 528 | - | 221 | 1,031 | 1,031 | - | - | - | 1,430 | - | - | - | 99,742 | 2,905 | - |
| 2a.1.1.2 | Recirculation Pumps & Motors | 40 | 63 | 16 | 51 | 42 | 539 | - | 186 | 938 | 938 | - | - | 96 | 945 | - | - | - | 112,200 | 1,563 | - |
| 2a.1.1.3 | CRDMs & NIs Removal | 194 | 1,020 | 415 | 135 | - | 1,130 | - | 696 | 3,591 | 3,591 | - | - | - | 3,741 | - | - | - | 213,700 | 17,768 | - |
| 2a.1.1.4 | Reactor Vessel Internals | 244 | 6,722 | 12,852 | 2,696 | - | 29,845 | 364 | 24,027 | 76,749 | 76,749 | - | - | - | 1,252 | 1,761 | 898 | - | 343,150 | 30,515 | 1,379 |
| 2a.1.1.5 | Reactor Vessel | 113 | 9,121 | 2,672 | 1,167 | - | 5,861 | 364 | 10,842 | 30,140 | 30,140 | - | - | - | 16,169 | - | - | - | 1,105,210 | 30,515 | 1,379 |
| 2a.1.1 | Totals | 702 | 17,020 | 15,982 | 4,099 | 42 | 37,903 | 728 | 35,973 | 112,449 | 112,449 | - | - | 96 | 23,536 | 1,761 | 898 | - | 1,874,002 | 83,267 | 2,758 |
| Removal of Major Equipment | | | | | | | | | | | | | | | | | | | | | |
| 2a.1.2 | Main Turbine/Generator | - | 385 | 1,356 | 521 | 6,139 | 439 | - | 1,341 | 10,182 | 10,182 | - | - | 24,835 | 1,383 | - | - | - | 1,577,959 | 5,438 | - |
| 2a.1.3 | Main Condensers | - | 1,347 | 360 | 194 | 3,225 | 244 | - | 947 | 6,317 | 6,317 | - | - | 17,396 | 727 | - | - | - | 828,955 | 18,831 | - |
| Cascading Costs from Clean Building Demolition | | | | | | | | | | | | | | | | | | | | | |
| 2a.1.4.1 | Reactor Building | - | 332 | - | - | - | - | - | 50 | 381 | 381 | - | - | - | - | - | - | - | - | 2,217 | - |
| 2a.1.4.2 | Radwaste | - | 25 | - | - | - | - | - | 4 | 28 | 28 | - | - | - | - | - | - | - | - | 127 | - |
| 2a.1.4.3 | Turbine | - | 127 | - | - | - | - | - | 19 | 146 | 146 | - | - | - | - | - | - | - | - | 1,254 | - |
| 2a.1.4 | Totals | - | 483 | - | - | - | - | - | 72 | 556 | 556 | - | - | - | - | - | - | - | - | 3,598 | - |
| Disposal of Plant Systems | | | | | | | | | | | | | | | | | | | | | |
| 2a.1.5.1 | Automatic Press Relief | - | 118 | 7 | 12 | 134 | 70 | - | 70 | 410 | 410 | - | - | 803 | 206 | - | - | - | 45,852 | 1,656 | - |
| 2a.1.5.2 | Chemistry Sampling | - | 27 | 1 | 2 | 26 | 13 | - | 14 | 83 | 83 | - | - | 156 | 37 | - | - | - | 8,681 | 400 | - |
| 2a.1.5.3 | Chemistry Sampling - Insulated | - | 2 | 0 | 0 | - | 0 | - | 1 | 3 | 3 | - | - | - | 1 | - | - | - | 72 | 28 | - |
| 2a.1.5.4 | Circulating Water - RCA | - | 207 | 14 | 62 | 1,114 | - | - | 230 | 1,626 | 1,626 | - | - | 6,656 | - | - | - | - | 270,307 | 2,860 | - |
| 2a.1.5.5 | Combustible Gas Control - Insul - RCA | - | 29 | 0 | 2 | 36 | - | - | 13 | 80 | 80 | - | - | 212 | - | - | - | - | 8,617 | 378 | - |
| 2a.1.5.6 | Combustible Gas Control - RCA | - | 18 | 1 | 3 | 48 | - | - | 12 | 81 | 81 | - | - | 285 | - | - | - | - | 11,577 | 245 | - |
| 2a.1.5.7 | Condensate & Feedwater | - | 987 | 183 | 329 | 3,337 | 2,464 | - | 1,431 | 8,731 | 8,731 | - | - | 19,947 | 7,319 | - | - | - | 1,275,810 | 14,196 | - |
| 2a.1.5.8 | Condensate & Feedwater - Insulated | - | 492 | 34 | 63 | 699 | 408 | - | 343 | 2,038 | 2,038 | - | - | 4,176 | 1,207 | - | - | - | 246,693 | 6,964 | - |
| 2a.1.5.9 | Condensate Demin | - | 545 | 30 | 51 | 560 | 339 | - | 316 | 1,840 | 1,840 | - | - | 3,346 | 1,000 | - | - | - | 199,936 | 7,618 | - |
| 2a.1.5.10 | Condensate Storage | - | 726 | 33 | 82 | 1,193 | 270 | - | 444 | 2,748 | 2,748 | - | - | 7,131 | 795 | - | - | - | 340,568 | 10,345 | - |
| 2a.1.5.11 | Control Rod Drive | - | 3 | 0 | 0 | 3 | 1 | - | 2 | 9 | 9 | - | - | 19 | 4 | - | - | - | 1,009 | 41 | - |
| 2a.1.5.12 | Control Rod Drive Hydraulic | - | 416 | 16 | 26 | 277 | 190 | - | 199 | 1,124 | 1,124 | - | - | 1,658 | 562 | - | - | - | 103,306 | 5,898 | - |
| 2a.1.5.13 | Core Spray | - | 79 | 20 | 51 | 734 | 176 | - | 184 | 1,244 | 1,244 | - | - | 4,384 | 521 | - | - | - | 211,329 | 1,163 | - |
| 2a.1.5.14 | Core Spray - Insulated | - | 145 | 8 | 13 | 137 | 90 | - | 82 | 474 | 474 | - | - | 818 | 264 | - | - | - | 50,149 | 2,033 | - |
| 2a.1.5.15 | Demin Water - Insulated - RCA | - | 15 | 0 | 1 | 14 | - | - | 6 | 36 | 36 | - | - | 85 | - | - | - | - | 3,445 | 181 | - |
| 2a.1.5.16 | Demin Water - RCA | - | 41 | 1 | 2 | 42 | - | - | 17 | 104 | 104 | - | - | 253 | - | - | - | - | 10,278 | 508 | - |
| 2a.1.5.17 | Diesel Oil - RCA | - | 2 | 0 | 0 | 4 | - | - | 1 | 7 | 7 | - | - | 23 | - | - | - | - | 931 | 25 | - |
| 2a.1.5.18 | Drywell Atmosphere Cooling - RCA | - | 38 | 1 | 5 | 92 | - | - | 24 | 159 | 159 | - | - | 548 | - | - | - | - | 22,244 | 550 | - |
| 2a.1.5.19 | EDG Emerg Service Water - Insul - RCA | - | 0 | 0 | 0 | 0 | - | - | 0 | 1 | 1 | - | - | 2 | - | - | - | - | 84 | 4 | - |
| 2a.1.5.20 | Electrical - Clean | - | 13 | - | - | - | - | - | 2 | 15 | - | - | - | - | - | - | - | - | - | 182 | - |
| 2a.1.5.21 | Emergency Service Water - Insul - RCA | - | 21 | 0 | 1 | 23 | - | - | 9 | 55 | 55 | - | - | 137 | - | - | - | - | 5,544 | 281 | - |
| 2a.1.5.22 | Emergency Service Water - RCA | - | 2 | 0 | 0 | 2 | - | - | 1 | 5 | 5 | - | - | 13 | - | - | - | - | 512 | 22 | - |
| 2a.1.5.23 | GEZIP - RCA | - | 3 | 0 | 1 | 17 | - | - | 4 | 25 | 25 | - | - | 103 | - | - | - | - | 4,184 | 48 | - |
| 2a.1.5.24 | Generator Physical Design - RCA | - | 5 | 0 | 0 | 5 | - | - | 2 | 12 | 12 | - | - | 31 | - | - | - | - | 1,250 | 67 | - |
| 2a.1.5.25 | H2-O2 Control Analyzing | - | 6 | 0 | 0 | 1 | 5 | - | 3 | 15 | 15 | - | - | 6 | 13 | - | - | - | 1,080 | 81 | - |
| 2a.1.5.26 | H2-O2 Control Analyzing - Insulated | - | 6 | 0 | 0 | 1 | 5 | - | 3 | 15 | 15 | - | - | 6 | 13 | - | - | - | 1,080 | 81 | - |
| 2a.1.5.27 | High Pressure Coolant Injection | - | 67 | 6 | 13 | 163 | 70 | - | 61 | 381 | 381 | - | - | 972 | 209 | - | - | - | 52,792 | 966 | - |
| 2a.1.5.28 | High Pressure Coolant Injection - Insula | - | 219 | 14 | 24 | 267 | 163 | - | 141 | 830 | 830 | - | - | 1,598 | 481 | - | - | - | 95,733 | 3,079 | - |
| 2a.1.5.29 | Hydrogen Cooling | - | 8 | - | - | - | - | - | 1 | 10 | - | - | - | - | - | - | - | - | - | 118 | - |
| 2a.1.5.30 | Hydrogen Cooling - RCA | - | 7 | 0 | 0 | 7 | - | - | 3 | 17 | 17 | - | - | 39 | - | - | - | - | 1,600 | 79 | - |
| 2a.1.5.31 | Hydrogen Seal Oil - RCA | - | 17 | 0 | 2 | 32 | - | - | 9 | 60 | 60 | - | - | 189 | - | - | - | - | 7,669 | 212 | - |
| 2a.1.5.32 | Hydrogen Water Chemistry - RCA | - | 24 | 0 | 1 | 23 | - | - | 10 | 59 | 59 | - | - | 140 | - | - | - | - | 5,672 | 304 | - |
| 2a.1.5.33 | Instrument & Service Air - RCA | - | 225 | 4 | 17 | 296 | - | - | 103 | 644 | 644 | - | - | 1,768 | - | - | - | - | 71,810 | 2,733 | - |
| 2a.1.5.34 | Main Condenser | - | 196 | 12 | 20 | 223 | 139 | - | 122 | 712 | 712 | - | - | 1,333 | 411 | - | - | - | 80,439 | 2,746 | - |
| 2a.1.5.35 | Main Steam | - | 249 | 17 | 32 | 359 | 201 | - | 173 | 1,029 | 1,029 | - | - | 2,148 | 594 | - | - | - | 125,135 | 3,512 | - |
| 2a.1.5.36 | Main Turbine | - | 1,012 | 205 | 353 | 3,306 | 2,921 | - | 1,553 | 9,350 | 9,350 | - | - | 19,760 | 8,687 | - | - | - | 1,354,661 | 14,733 | - |
| 2a.1.5.37 | Main Turbine - Insulated | - | 214 | 18 | 37 | 423 | 225 | - | 180 | 1,097 | 1,097 | - | - | 2,530 | 667 | - | - | - | 145,208 | 3,069 | - |
| 2a.1.5.38 | Miscellaneous | - | 43 | 1 | 3 | 51 | - | - | 19 | 115 | 115 | - | - | 302 | - | - | - | - | 12,283 | 622 | - |
| 2a.1.5.39 | Off Gas Recombiner | - | 189 | 19 | 32 | 300 | 257 | - | 163 | 960 | 960 | - | - | 1,795 | 764 | - | - | - | 121,554 | 2,708 | - |
| 2a.1.5.40 | Off Gas Recombiner - Insulated | - | 387 | 19 | 27 | 229 | 240 | - | 197 | 1,100 | 1,100 | - | - | 1,366 | 709 | - | - | - | 100,933 | 5,385 | - |
| 2a.1.5.41 | Post Accident Sampling | - | 25 | 1 | 1 | 9 | 11 | - | 11 | 58 | 58 | - | - | 53 | 33 | - | - | - | 4,318 | 345 | - |
| 2a.1.5.42 | Post Accident Sampling - Insulated | - | 17 | 1 | 1 | 3 | 13 | - | 8 | 43 | 43 | - | - | 17 | 37 | - | - | - | 3,116 | 212 | - |
| 2a.1.5.43 | RHR Service Water - Insulated - RCA | - | 83 | 3 | 14 | 248 | - | - | 60 | 409 | 409 | - | - | 1,485 | - | - | - | - | 60,293 | 1,125 | - |
| 2a.1.5.44 | RHR Service Water - RCA | - | 4 | 0 | 0 | 6 | - | - | 2 | 12 | 12 | - | - | 35 | - | - | - | - | 1,410 | 57 | - |
| 2a.1.5.45 | Reactor Feedwater Pump Seal | - | 56 | 2 | 4 | 32 | 33 | - | 28 | 155 | 155 | - | - | 193 | 96 | - | - | - | 14,009 | 773 | - |

**Monticello Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table C
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with DOE Pickup of Industry Fuel Starting in 2035
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|--|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| Disposal of Plant Systems (continued) | | | | | | | | | | | | | | | | | | | | | |
| 2a.1.5.46 | Residual Heat Removal | 362 | 252 | 172 | 178 | 1,072 | 2,051 | - | 962 | 5,049 | 5,049 | - | - | 6,406 | 6,012 | - | - | - | 647,941 | 4,135 | - |
| 2a.1.5.47 | Residual Heat Removal - Insulated | 622 | 554 | 61 | 82 | 563 | 880 | - | 772 | 3,535 | 3,535 | - | - | 3,367 | 2,607 | - | - | - | 303,087 | 10,340 | - |
| 2a.1.5.48 | Rx Core Isolation Cooling | - | 49 | 2 | 4 | 43 | 26 | - | 26 | 150 | 150 | - | - | 259 | 76 | - | - | - | 15,396 | 691 | - |
| 2a.1.5.49 | Rx Core Isolation Cooling - Insulated | - | 107 | 5 | 7 | 48 | 67 | - | 52 | 287 | 287 | - | - | 288 | 198 | - | - | - | 24,419 | 1,479 | - |
| 2a.1.5.50 | Rx Recirculation | 56 | 58 | 6 | 4 | 7 | 65 | - | 61 | 258 | 258 | - | - | 43 | 190 | - | - | - | 14,095 | 1,580 | - |
| 2a.1.5.51 | Snubbers | - | 169 | 2 | 5 | 63 | 30 | - | 60 | 331 | 331 | - | - | 377 | 90 | - | - | - | 21,009 | 2,548 | - |
| 2a.1.5.52 | Standby Liquid Control - Insul - RCA | - | 4 | 0 | 0 | 4 | - | - | 2 | 9 | 9 | - | - | 22 | - | - | - | - | 904 | 48 | - |
| 2a.1.5.53 | Standby Liquid Control - RCA | - | 26 | 1 | 2 | 41 | - | - | 13 | 83 | 83 | - | - | 245 | - | - | - | - | 9,969 | 341 | - |
| 2a.1.5.54 | Stator Cooling - RCA | - | 7 | 0 | 1 | 21 | - | - | 5 | 35 | 35 | - | - | 126 | - | - | - | - | 5,135 | 98 | - |
| 2a.1.5.55 | Traversing Incore Probe | 0 | 4 | 0 | 0 | 0 | 2 | - | 1 | 7 | 7 | - | - | 1 | 5 | - | - | - | 386 | 51 | - |
| 2a.1.5 | Totals | 1,040 | 8,221 | 924 | 1,572 | 16,339 | 11,425 | - | 8,209 | 47,730 | 47,706 | - | 24 | 97,654 | 33,808 | - | - | - | 6,125,515 | 119,943 | - |
| 2a.1.6 | Scaffolding in support of decommissioning | - | 2,265 | 22 | 12 | 191 | 31 | - | 607 | 3,127 | 3,127 | - | - | 1,030 | 91 | - | - | - | 52,111 | 22,564 | - |
| 2a.1 | Subtotal Period 2a Activity Costs | 1,742 | 29,721 | 18,645 | 6,398 | 25,937 | 50,042 | 728 | 47,148 | 180,360 | 180,336 | - | 24 | 141,010 | 59,545 | 1,761 | 898 | - | 10,458,540 | 253,640 | 2,758 |
| Period 2a Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 2a.3.1 | Process decommissioning water waste | 85 | - | 57 | 102 | - | 232 | - | 122 | 598 | 598 | - | - | - | 532 | - | - | - | 31,942 | 104 | - |
| 2a.3.2 | Process decommissioning chemical flush waste | 5 | - | 216 | 702 | - | 1,619 | - | 534 | 3,077 | 3,077 | - | - | - | 2,093 | - | - | - | 223,008 | 392 | - |
| 2a.3.3 | Small tool allowance | - | 324 | - | - | - | - | - | 49 | 373 | 336 | - | 37 | - | - | - | - | - | - | - | - |
| 2a.3.4 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 13,661 | 2,049 | 15,710 | - | 15,710 | - | - | - | - | - | - | - | - | - |
| 2a.3.5 | Retention and Severance | - | - | - | - | - | - | 13,127 | 1,969 | 15,097 | - | - | - | - | - | - | - | - | - | - | - |
| 2a.3 | Subtotal Period 2a Collateral Costs | 91 | 324 | 274 | 804 | - | 1,851 | 26,788 | 4,723 | 34,854 | 19,107 | 15,710 | 37 | - | 2,625 | - | - | - | 254,950 | 495 | - |
| Period 2a Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 2a.4.1 | Decon supplies | 112 | - | - | - | - | - | - | 28 | 140 | 140 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.2 | Insurance | - | - | - | - | - | - | 1,019 | 102 | 1,121 | 1,121 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.3 | Property taxes | - | - | - | - | - | - | 4,377 | 438 | 4,814 | 4,814 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.4 | Health physics supplies | - | 2,356 | - | - | - | - | - | 589 | 2,945 | 2,945 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.5 | Heavy equipment rental | - | 3,627 | - | - | - | - | - | 544 | 4,171 | 4,171 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.6 | Disposal of DAW generated | - | - | 110 | 57 | - | 457 | - | 134 | 758 | 758 | - | - | - | 5,551 | - | - | - | 111,023 | 181 | - |
| 2a.4.7 | Plant energy budget | - | - | - | - | - | - | 2,501 | 375 | 2,876 | 2,876 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.8 | NRC Fees | - | - | - | - | - | - | 856 | 86 | 942 | 942 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.9 | Emergency Planning Fees | - | - | - | - | - | - | 4,115 | 412 | 4,527 | - | 4,527 | - | - | - | - | - | - | - | - | - |
| 2a.4.10 | Fixed Overhead | - | - | - | - | - | - | 3,071 | 461 | 3,532 | 3,532 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.11 | Spent Fuel Pool O&M | - | - | - | - | - | - | 1,224 | 184 | 1,408 | - | 1,408 | - | - | - | - | - | - | - | - | - |
| 2a.4.12 | ISFSI Operating Costs | - | - | - | - | - | - | 162 | 24 | 187 | - | 187 | - | - | - | - | - | - | - | - | - |
| 2a.4.13 | Railroad Track Maintenance | - | - | - | - | - | - | 181 | 27 | 208 | 208 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.14 | Remedial Actions Surveys | - | - | - | - | - | - | 1,624 | 244 | 1,867 | 1,867 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.15 | Security Staff Cost | - | - | - | - | - | - | 21,881 | 3,282 | 25,164 | 25,164 | - | - | - | - | - | - | - | - | - | 325,574 |
| 2a.4.16 | DOC Staff Cost | - | - | - | - | - | - | 21,021 | 3,153 | 24,174 | 24,174 | - | - | - | - | - | - | - | - | - | 229,108 |
| 2a.4.17 | Utility Staff Cost | - | - | - | - | - | - | 27,906 | 4,186 | 32,092 | 32,092 | - | - | - | - | - | - | - | - | - | 426,562 |
| 2a.4 | Subtotal Period 2a Period-Dependent Costs | 112 | 5,982 | 110 | 57 | - | 457 | 89,938 | 14,267 | 110,924 | 104,803 | 6,121 | - | - | 5,551 | - | - | - | 111,023 | 181 | 981,244 |
| 2a.0 | TOTAL PERIOD 2a COST | 1,945 | 36,028 | 19,028 | 7,259 | 25,937 | 52,350 | 117,455 | 66,138 | 326,139 | 304,246 | 21,831 | 62 | 141,010 | 67,722 | 1,761 | 898 | - | 10,824,520 | 254,317 | 984,002 |
| PERIOD 2b - Site Decontamination | | | | | | | | | | | | | | | | | | | | | |
| Period 2b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| Disposal of Plant Systems | | | | | | | | | | | | | | | | | | | | | |
| 2b.1.1.1 | ALARA/Radiological | - | 18 | 0 | 1 | 6 | 3 | - | 6 | 35 | 35 | - | - | 35 | 10 | - | - | - | 2,060 | 277 | - |
| 2b.1.1.2 | Alternate N2 - RCA | - | 16 | 0 | 1 | 16 | - | - | 7 | 40 | 40 | - | - | 93 | - | - | - | - | 3,765 | 185 | - |
| 2b.1.1.3 | Decontamination Projects | - | 1 | 0 | 0 | 0 | 0 | - | 0 | 2 | 2 | - | - | 2 | 0 | - | - | - | 129 | 17 | - |
| 2b.1.1.4 | Electrical - Contaminated | - | 445 | 6 | 24 | 400 | 30 | - | 183 | 1,089 | 1,089 | - | - | 2,389 | 90 | - | - | - | 102,726 | 6,325 | - |
| 2b.1.1.5 | Electrical - Decontaminated | - | 2,698 | 48 | 218 | 3,906 | - | - | 1,298 | 8,167 | 8,167 | - | - | 23,344 | - | - | - | - | 948,013 | 37,107 | - |
| 2b.1.1.6 | Fire - RCA | - | 101 | 1 | 6 | 103 | - | - | 42 | 253 | 253 | - | - | 614 | - | - | - | - | 24,917 | 1,324 | - |
| 2b.1.1.7 | HVAC Ductwork | - | 305 | 7 | 27 | 446 | 34 | - | 156 | 975 | 975 | - | - | 2,665 | 100 | - | - | - | 114,598 | 4,111 | - |
| 2b.1.1.8 | HVAC/Chilled Water - RCA | - | 324 | 6 | 26 | 461 | - | - | 155 | 971 | 971 | - | - | 2,752 | - | - | - | - | 111,779 | 3,985 | - |
| 2b.1.1.9 | Heating & Ventilation | - | 483 | 16 | 61 | 1,007 | 76 | - | 302 | 1,945 | 1,945 | - | - | 6,018 | 227 | - | - | - | 258,789 | 7,101 | - |
| 2b.1.1.10 | Heating Boiler - Insulated - RCA | - | 3 | 0 | 0 | 4 | - | - | 1 | 9 | 9 | - | - | 26 | - | - | - | - | 1,058 | 35 | - |
| 2b.1.1.11 | Liquid Radwaste | 588 | 687 | 48 | 63 | 514 | 586 | - | 703 | 3,188 | 3,188 | - | - | 3,073 | 1,728 | - | - | - | 235,484 | 17,194 | - |
| 2b.1.1.12 | Makeup Demin - RCA | - | 103 | 3 | 14 | 246 | - | - | 65 | 431 | 431 | - | - | 1,471 | - | - | - | - | 59,747 | 1,412 | - |
| 2b.1.1.13 | Non-Essential Diesel Generator - RCA | - | 27 | 3 | 13 | 238 | - | - | 45 | 327 | 327 | - | - | 1,424 | - | - | - | - | 57,832 | 395 | - |
| 2b.1.1.14 | Off Gas Holdup | - | 342 | 21 | 38 | 461 | 214 | - | 216 | 1,291 | 1,291 | - | - | 2,755 | 630 | - | - | - | 152,277 | 4,769 | - |
| 2b.1.1.15 | Primary Containment | - | 455 | 42 | 87 | 1,038 | 507 | - | 414 | 2,543 | 2,543 | - | - | 6,201 | 1,506 | - | - | - | 347,704 | 6,454 | - |
| 2b.1.1.16 | Process Radiation Monitors | - | 46 | 2 | 2 | 24 | 18 | - | 20 | 111 | 111 | - | - | 142 | 52 | - | - | - | 9,115 | 649 | - |

**Monticello Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table C
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with DOE Pickup of Industry Fuel Starting in 2035
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|---------------------------------------|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|-------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| Disposal of Plant Systems (continued) | | | | | | | | | | | | | | | | | | | | | | |
| 2b.1.1.17 | Rx Bldg Closed Cng Water - Insul - RCA | - | 114 | 2 | 9 | 163 | - | - | 54 | 343 | 343 | - | - | 977 | - | - | - | - | - | 39,675 | 1,484 | - |
| 2b.1.1.18 | Rx Bldg Closed Cng Water - RCA | - | 184 | 15 | 66 | 1,187 | - | - | 235 | 1,687 | 1,687 | - | - | 7,093 | - | - | - | - | - | 288,031 | 2,489 | - |
| 2b.1.1.19 | Rx Component Handling Equip | 27 | 142 | 18 | 27 | 194 | 279 | - | 154 | 840 | 840 | - | - | 1,158 | 829 | - | - | - | - | 99,730 | 2,462 | - |
| 2b.1.1.20 | Rx Pressure Vessel | 28 | 47 | 6 | 5 | 13 | 78 | - | 48 | 225 | 225 | - | - | 75 | 230 | - | - | - | - | 17,816 | 1,051 | - |
| 2b.1.1.21 | Rx Water Cleanup | 172 | 265 | 19 | 16 | 22 | 251 | - | 222 | 965 | 965 | - | - | 130 | 737 | - | - | - | - | 52,670 | 5,736 | - |
| 2b.1.1.22 | Secondary Containment | - | 124 | 7 | 14 | 170 | 86 | - | 81 | 483 | 483 | - | - | 1,017 | 255 | - | - | - | - | 57,567 | 1,763 | - |
| 2b.1.1.23 | Service & Seal Water - Insulated - RCA | - | 120 | 2 | 11 | 197 | - | - | 62 | 392 | 392 | - | - | 1,180 | - | - | - | - | - | 47,917 | 1,565 | - |
| 2b.1.1.24 | Service & Seal Water - RCA | - | 159 | 4 | 17 | 303 | - | - | 88 | 570 | 570 | - | - | 1,809 | - | - | - | - | - | 73,453 | 2,016 | - |
| 2b.1.1.25 | Service Air Blower - RCA | - | 15 | 0 | 2 | 34 | - | - | 9 | 62 | 62 | - | - | 206 | - | - | - | - | - | 8,364 | 206 | - |
| 2b.1.1.26 | Solid Radwaste | 338 | 494 | 36 | 49 | 399 | 467 | - | 480 | 2,264 | 2,264 | - | - | 2,387 | 1,380 | - | - | - | - | 185,221 | 10,820 | - |
| 2b.1.1.27 | Structures & Buildings | - | 78 | 2 | 5 | 60 | 29 | - | 37 | 210 | 210 | - | - | 357 | 85 | - | - | - | - | 19,933 | 1,128 | - |
| 2b.1.1.28 | Wells & Domestic Water | - | 10 | - | - | - | - | - | 1 | 11 | - | - | 11 | - | - | - | - | - | - | - | 144 | - |
| 2b.1.1.29 | Wells & Domestic Water - RCA | - | 52 | 1 | 3 | 57 | - | - | 22 | 136 | 136 | - | - | 342 | - | - | - | - | - | 13,874 | 633 | - |
| 2b.1.1 | Totals | 1,153 | 7,860 | 315 | 804 | 11,668 | 2,657 | - | 5,107 | 29,563 | 29,552 | - | - | 69,735 | 7,859 | - | - | - | - | 3,334,244 | 122,835 | - |
| 2b.1.2 | Scaffolding in support of decommissioning | - | 2,831 | 28 | 16 | 239 | 38 | - | 758 | 3,909 | 3,909 | - | - | 1,287 | 114 | - | - | - | - | 65,139 | 28,205 | - |
| Decontamination of Site Buildings | | | | | | | | | | | | | | | | | | | | | | |
| 2b.1.3.1 | Reactor Building | 5,202 | 2,903 | 178 | 516 | 8,044 | 1,181 | - | 4,924 | 22,948 | 22,948 | - | - | 48,077 | 7,014 | - | - | - | - | 2,317,670 | 112,518 | - |
| 2b.1.3.2 | Admin | 106 | 6 | 0 | 3 | - | 15 | - | 59 | 189 | 189 | - | - | - | 145 | - | - | - | - | 6,840 | 1,600 | - |
| 2b.1.3.3 | HPCI Room | 29 | 28 | 1 | 3 | 20 | 14 | - | 29 | 123 | 123 | - | - | 118 | 125 | - | - | - | - | 10,759 | 789 | - |
| 2b.1.3.4 | Hot Shop | 17 | 4 | 0 | 2 | - | 11 | - | 12 | 46 | 46 | - | - | - | 103 | - | - | - | - | 4,860 | 286 | - |
| 2b.1.3.5 | LLRW Storage & Shipping | 58 | 24 | 2 | 8 | 5 | 45 | - | 48 | 191 | 191 | - | - | 31 | 433 | - | - | - | - | 21,708 | 1,127 | - |
| 2b.1.3.6 | Offgas Stack | 372 | 269 | 7 | 23 | 225 | 82 | - | 312 | 1,289 | 1,289 | - | - | 1,343 | 669 | - | - | - | - | 87,045 | 8,860 | - |
| 2b.1.3.7 | Offgas Storage & Compressor | 41 | 17 | 1 | 6 | 4 | 33 | - | 34 | 136 | 136 | - | - | 25 | 316 | - | - | - | - | 15,948 | 785 | - |
| 2b.1.3.8 | Radwaste | 121 | 61 | 3 | 17 | 29 | 96 | - | 107 | 435 | 435 | - | - | 172 | 910 | - | - | - | - | 49,943 | 2,503 | - |
| 2b.1.3.9 | Radwaste Material Storage Warehouse | 64 | 24 | 2 | 9 | - | 52 | - | 52 | 202 | 202 | - | - | - | 495 | - | - | - | - | 23,400 | 1,197 | - |
| 2b.1.3.10 | Recombiner | 27 | 25 | 1 | 5 | 33 | 24 | - | 32 | 148 | 148 | - | - | 199 | 216 | - | - | - | - | 18,405 | 695 | - |
| 2b.1.3.11 | Turbine | 705 | 353 | 21 | 104 | 215 | 564 | - | 632 | 2,594 | 2,594 | - | - | 1,283 | 5,299 | - | - | - | - | 303,150 | 14,443 | - |
| 2b.1.3.12 | Turbine Building Addition | 58 | 21 | 1 | 8 | - | 45 | - | 47 | 181 | 181 | - | - | - | 434 | - | - | - | - | 20,478 | 1,087 | - |
| 2b.1.3 | Totals | 6,799 | 3,736 | 218 | 704 | 8,574 | 2,164 | - | 6,288 | 28,483 | 28,483 | - | - | 51,247 | 16,159 | - | - | - | - | 2,880,206 | 145,889 | - |
| 2b.1.4 | Prepare/submit License Termination Plan | - | - | - | - | - | - | 526 | 79 | 605 | 605 | - | - | - | - | - | - | - | - | - | - | 4,096 |
| 2b.1.5 | Receive NRC approval of termination plan | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - | - | |
| 2b.1 | Subtotal Period 2b Activity Costs | 7,952 | 14,427 | 560 | 1,524 | 20,481 | 4,859 | 526 | 12,232 | 62,561 | 62,549 | - | - | 11 | 122,269 | 24,132 | - | - | - | 6,279,589 | 296,929 | 4,096 |
| Period 2b Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 2b.2.1 | Operational Equipment | - | - | 23 | 92 | 1,211 | - | - | 198 | 1,524 | 1,524 | - | - | 11,760 | - | - | - | - | - | 294,000 | 32 | - |
| 2b.2.2 | Excavation of Underground Services | - | 1,972 | - | - | - | - | 376 | 550 | 2,898 | 2,898 | - | - | - | - | - | - | - | - | - | 12,493 | - |
| 2b.2.3 | Security Modifications | - | - | - | - | - | - | 8,696 | 1,304 | 10,000 | 10,000 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.2 | Subtotal Period 2b Additional Costs | - | 1,972 | 23 | 92 | 1,211 | - | 9,072 | 2,052 | 14,422 | 14,422 | - | - | 11,760 | - | - | - | - | - | 294,000 | 12,525 | - |
| Period 2b Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 2b.3.1 | Process decommissioning water waste | 198 | - | 135 | 240 | - | 546 | - | 285 | 1,404 | 1,404 | - | - | - | 1,253 | - | - | - | - | 75,186 | 244 | - |
| 2b.3.2 | Process decommissioning chemical flush waste | 1 | - | 43 | 138 | - | 319 | - | 105 | 607 | 607 | - | - | - | 413 | - | - | - | - | 43,978 | 77 | - |
| 2b.3.3 | Small tool allowance | - | 364 | - | - | - | - | - | 55 | 418 | 418 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.3.4 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 117,254 | 17,588 | 134,843 | - | 134,843 | - | - | - | - | - | - | - | - | - | - |
| 2b.3.5 | Retention and Severance | - | - | - | - | - | - | 6,299 | 945 | 7,244 | 7,244 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.3 | Subtotal Period 2b Collateral Costs | 199 | 364 | 178 | 378 | - | 865 | 123,554 | 18,978 | 144,516 | 9,673 | 134,843 | - | - | 1,666 | - | - | - | - | 119,165 | 322 | - |
| Period 2b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 2b.4.1 | Decon supplies | 1,440 | - | - | - | - | - | - | 360 | 1,799 | 1,799 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.2 | Insurance | - | - | - | - | - | - | 742 | 74 | 816 | 816 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.3 | Property taxes | - | - | - | - | - | - | 2,703 | 270 | 2,974 | 2,974 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.4 | Health physics supplies | - | 2,376 | - | - | - | - | - | 594 | 2,970 | 2,970 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.5 | Heavy equipment rental | - | 2,711 | - | - | - | - | - | 407 | 3,117 | 3,117 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.6 | Disposal of DAW generated | - | - | 101 | 52 | - | 419 | - | 123 | 694 | 694 | - | - | - | 5,084 | - | - | - | - | 101,679 | 166 | - |
| 2b.4.7 | Plant energy budget | - | - | - | - | - | - | 1,437 | 216 | 1,653 | 1,653 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.8 | NRC Fees | - | - | - | - | - | - | 623 | 62 | 685 | 685 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.9 | Emergency Planning Fees | - | - | - | - | - | - | 2,995 | 299 | 3,294 | - | 3,294 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.10 | Fixed Overhead | - | - | - | - | - | - | 2,235 | 335 | 2,570 | 2,570 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.11 | Spent Fuel Pool O&M | - | - | - | - | - | - | 891 | 134 | 1,024 | - | 1,024 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.12 | Liquid Radwaste Processing Equipment/Services | - | - | - | - | - | - | 224 | 34 | 258 | 258 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.13 | ISFSI Operating Costs | - | - | - | - | - | - | 118 | 18 | 136 | - | 136 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.14 | Railroad Track Maintenance | - | - | - | - | - | - | 458 | 69 | 527 | 527 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.15 | Remedial Actions Surveys | - | - | - | - | - | - | 1,182 | 177 | 1,359 | 1,359 | - | - | - | - | - | - | - | - | - | - | - |

**Monticello Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table C
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with DOE Pickup of Industry Fuel Starting in 2035
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|---------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| Period 2b Period-Dependent Costs (continued) | | | | | | | | | | | | | | | | | | | | | | |
| 2b.4.16 | Security Staff Cost | - | - | - | - | - | - | 15,925 | 2,389 | 18,314 | 18,314 | - | - | - | - | - | - | - | - | - | 236,949 | |
| 2b.4.17 | DOC Staff Cost | - | - | - | - | - | - | 14,772 | 2,216 | 16,988 | 16,988 | - | - | - | - | - | - | - | - | - | 160,160 | |
| 2b.4.18 | Utility Staff Cost | - | - | - | - | - | - | 19,442 | 2,916 | 22,358 | 22,358 | - | - | - | - | - | - | - | - | - | 297,283 | |
| 2b.4 | Subtotal Period 2b Period-Dependent Costs | 1,440 | 5,087 | 101 | 52 | - | 419 | 63,747 | 10,692 | 81,536 | 77,082 | 4,455 | - | - | 5,084 | - | - | - | - | 101,679 | 166 | 694,392 |
| 2b.0 | TOTAL PERIOD 2b COST | 9,591 | 21,850 | 861 | 2,046 | 21,692 | 6,143 | 196,899 | 43,954 | 303,035 | 163,726 | 139,297 | 11 | 134,029 | 30,882 | - | - | - | - | 6,794,433 | 309,941 | 698,488 |
| PERIOD 2d - Decontamination Following Wet Fuel Storage | | | | | | | | | | | | | | | | | | | | | | |
| Period 2d Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| 2d.1.1 | Remove spent fuel racks | 654 | 58 | 103 | 149 | - | 2,572 | - | 1,017 | 4,553 | 4,553 | - | - | - | 7,653 | - | - | - | - | 486,170 | 906 | - |
| Disposal of Plant Systems | | | | | | | | | | | | | | | | | | | | | | |
| 2d.1.2.1 | Cranes/Heavy Loads/Rigging - RCA | - | 3 | 0 | 1 | 17 | - | - | 4 | 25 | 25 | - | - | 103 | - | - | - | - | - | 4,184 | 48 | - |
| 2d.1.2.2 | Electrical - Contaminated Fuel Pool | - | 47 | 1 | 2 | 40 | 3 | - | 19 | 112 | 112 | - | - | 240 | 9 | - | - | - | - | 10,334 | 665 | - |
| 2d.1.2.3 | Electrical - Decontam. Fuel Pool Area | - | 297 | 5 | 23 | 411 | - | - | 140 | 876 | 876 | - | - | 2,457 | - | - | - | - | - | 99,783 | 4,090 | - |
| 2d.1.2.4 | Fire - RCA - Fuel Pool Area | - | 11 | 0 | 1 | 10 | - | - | 4 | 26 | 26 | - | - | 62 | - | - | - | - | - | 2,499 | 143 | - |
| 2d.1.2.5 | Fuel Pool Cooling & Cleanup | 246 | 428 | 34 | 37 | 197 | 455 | - | 382 | 1,781 | 1,781 | - | - | 1,179 | 1,341 | - | - | - | - | 133,939 | 8,380 | - |
| 2d.1.2.6 | Fuel Pool Cooling & Cleanup - Insulated | 27 | 41 | 3 | 3 | 11 | 40 | - | 36 | 161 | 161 | - | - | 67 | 117 | - | - | - | - | 10,220 | 848 | - |
| 2d.1.2.7 | HVAC Ductwork - Fuel Pool Area | - | 34 | 1 | 3 | 50 | 4 | - | 17 | 108 | 108 | - | - | 296 | 11 | - | - | - | - | 12,733 | 457 | - |
| 2d.1.2.8 | HVAC/Chilled Water - RCA Fuel Pool Area | - | 33 | 0 | 2 | 37 | - | - | 14 | 87 | 87 | - | - | 223 | - | - | - | - | - | 9,072 | 397 | - |
| 2d.1.2.9 | Instrument & Service Air-RCA-Fuel Pool | - | 29 | 1 | 2 | 45 | - | - | 14 | 91 | 91 | - | - | 267 | - | - | - | - | - | 10,841 | 357 | - |
| 2d.1.2 | Totals | 273 | 924 | 45 | 75 | 819 | 502 | - | 631 | 3,268 | 3,268 | - | - | 4,894 | 1,479 | - | - | - | - | 293,606 | 15,385 | - |
| Decontamination of Site Buildings | | | | | | | | | | | | | | | | | | | | | | |
| 2d.1.3.1 | Reactor (Post Fuel) | 946 | 2,599 | 172 | 913 | 329 | 10,216 | - | 3,880 | 19,056 | 19,056 | - | - | 1,969 | 62,698 | - | - | - | - | 2,732,406 | 45,703 | - |
| 2d.1.3 | Totals | 946 | 2,599 | 172 | 913 | 329 | 10,216 | - | 3,880 | 19,056 | 19,056 | - | - | 1,969 | 62,698 | - | - | - | - | 2,732,406 | 45,703 | - |
| 2d.1.4 | Scaffolding in support of decommissioning | - | 566 | 6 | 3 | 48 | 8 | - | 152 | 782 | 782 | - | - | 257 | 23 | - | - | - | - | 13,028 | 5,641 | - |
| 2d.1 | Subtotal Period 2d Activity Costs | 1,872 | 4,147 | 326 | 1,139 | 1,196 | 13,298 | - | 5,680 | 27,659 | 27,659 | - | - | 7,120 | 71,852 | - | - | - | - | 3,525,210 | 67,635 | - |
| Period 2d Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 2d.2.1 | License Termination Survey Planning | - | - | - | - | - | - | 1,458 | 437 | 1,896 | 1,896 | - | - | - | - | - | - | - | - | - | - | 12,480 |
| 2d.2 | Subtotal Period 2d Additional Costs | - | - | - | - | - | - | 1,458 | 437 | 1,896 | 1,896 | - | - | - | - | - | - | - | - | - | - | 12,480 |
| Period 2d Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 2d.3.1 | Process decommissioning water waste | 79 | - | 54 | 96 | - | 220 | - | 114 | 563 | 563 | - | - | - | 504 | - | - | - | - | 30,239 | 98 | - |
| 2d.3.2 | Process decommissioning chemical flush waste | 1 | - | 26 | 84 | - | 193 | - | 64 | 366 | 366 | - | - | - | 249 | - | - | - | - | 26,553 | 47 | - |
| 2d.3.3 | Small tool allowance | - | 91 | - | - | - | - | - | 14 | 105 | 105 | - | - | - | - | - | - | - | - | - | - | - |
| 2d.3.4 | Decommissioning Equipment Disposition | - | - | 130 | 82 | 1,112 | 178 | - | 237 | 1,739 | 1,739 | - | - | 6,000 | 529 | - | - | - | - | 303,608 | 147 | - |
| 2d.3.5 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 27 | 4 | 32 | - | 32 | - | - | - | - | - | - | - | - | - | - |
| 2d.3 | Subtotal Period 2d Collateral Costs | 80 | 91 | 210 | 262 | 1,112 | 590 | 27 | 432 | 2,805 | 2,773 | 32 | - | 6,000 | 1,282 | - | - | - | - | 360,400 | 292 | - |
| Period 2d Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 2d.4.1 | Decon supplies | 244 | - | - | - | - | - | - | 61 | 305 | 305 | - | - | - | - | - | - | - | - | - | - | - |
| 2d.4.2 | Insurance | - | - | - | - | - | - | 530 | 53 | 583 | 583 | - | - | - | - | - | - | - | - | - | - | - |
| 2d.4.3 | Property taxes | - | - | - | - | - | - | 1,664 | 166 | 1,830 | 1,830 | - | - | - | - | - | - | - | - | - | - | - |
| 2d.4.4 | Health physics supplies | - | 806 | - | - | - | - | - | 202 | 1,008 | 1,008 | - | - | - | - | - | - | - | - | - | - | - |
| 2d.4.5 | Heavy equipment rental | - | 1,936 | - | - | - | - | - | 290 | 2,227 | 2,227 | - | - | - | - | - | - | - | - | - | - | - |
| 2d.4.6 | Disposal of DAW generated | - | - | 40 | 21 | - | 167 | - | 49 | 277 | 277 | - | - | 2,030 | - | - | - | - | - | 40,600 | 66 | - |
| 2d.4.7 | Plant energy budget | - | - | - | - | - | - | 547 | 82 | 630 | 630 | - | - | - | - | - | - | - | - | - | - | - |
| 2d.4.8 | NRC Fees | - | - | - | - | - | - | 424 | 42 | 466 | 466 | - | - | - | - | - | - | - | - | - | - | - |
| 2d.4.9 | Emergency Planning Fees | - | - | - | - | - | - | 112 | 11 | 123 | - | 123 | - | - | - | - | - | - | - | - | - | - |
| 2d.4.10 | Fixed Overhead | - | - | - | - | - | - | 1,597 | 239 | 1,836 | 1,836 | - | - | - | - | - | - | - | - | - | - | - |
| 2d.4.11 | Liquid Radwaste Processing Equipment/Services | - | - | - | - | - | - | 320 | 48 | 368 | 368 | - | - | - | - | - | - | - | - | - | - | - |
| 2d.4.12 | ISFSI Operating Costs | - | - | - | - | - | - | 84 | 13 | 97 | - | 97 | - | - | - | - | - | - | - | - | - | - |
| 2d.4.13 | Railroad Track Maintenance | - | - | - | - | - | - | 94 | 14 | 108 | 108 | - | - | - | - | - | - | - | - | - | - | - |
| 2d.4.14 | Remedial Actions Surveys | - | - | - | - | - | - | 844 | 127 | 971 | 971 | - | - | - | - | - | - | - | - | - | - | - |
| 2d.4.15 | Security Staff Cost | - | - | - | - | - | - | 10,999 | 1,650 | 12,649 | 8,918 | 3,732 | - | - | - | - | - | - | - | - | - | 162,981 |
| 2d.4.16 | DOC Staff Cost | - | - | - | - | - | - | 7,311 | 1,097 | 8,408 | 8,408 | - | - | - | - | - | - | - | - | - | - | 78,356 |
| 2d.4.17 | Utility Staff Cost | - | - | - | - | - | - | 10,052 | 1,508 | 11,560 | 10,670 | 890 | - | - | - | - | - | - | - | - | - | 149,660 |
| 2d.4 | Subtotal Period 2d Period-Dependent Costs | 244 | 2,743 | 40 | 21 | - | 167 | 34,579 | 5,652 | 43,446 | 38,604 | 4,842 | - | - | 2,030 | - | - | - | - | 40,600 | 66 | 390,997 |
| 2d.0 | TOTAL PERIOD 2d COST | 2,196 | 6,981 | 576 | 1,422 | 2,308 | 14,055 | 36,065 | 12,202 | 75,806 | 70,932 | 4,873 | - | 13,120 | 75,164 | - | - | - | - | 3,926,210 | 67,993 | 403,477 |

**Monticello Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table C
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with DOE Pickup of Industry Fuel Starting in 2035
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|---|---------------|---------------|-----------------|-----------------|---------------------------|---------------------|----------------|-------------------|----------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| PERIOD 2f - License Termination | | | | | | | | | | | | | | | | | | | | | |
| Period 2f Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| 2f.1.1 | ORISE confirmatory survey | - | - | - | - | - | - | 166 | 50 | 216 | 216 | - | - | - | - | - | - | - | - | - | - |
| 2f.1.2 | Terminate license | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 2f.1 | Subtotal Period 2f Activity Costs | - | - | - | - | - | - | 166 | 50 | 216 | 216 | - | - | - | - | - | - | - | - | - | - |
| Period 2f Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 2f.2.1 | License Termination Survey | - | - | - | - | - | - | 6,920 | 2,076 | 8,995 | 8,995 | - | - | - | - | - | - | - | - | 95,048 | 6,240 |
| 2f.2 | Subtotal Period 2f Additional Costs | - | - | - | - | - | - | 6,920 | 2,076 | 8,995 | 8,995 | - | - | - | - | - | - | - | - | 95,048 | 6,240 |
| Period 2f Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 2f.3.1 | DOC staff relocation expenses | - | - | - | - | - | - | 1,264 | 190 | 1,454 | 1,454 | - | - | - | - | - | - | - | - | - | - |
| 2f.3.2 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 526 | 79 | 605 | - | 605 | - | - | - | - | - | - | - | - | - |
| 2f.3 | Subtotal Period 2f Collateral Costs | - | - | - | - | - | - | 1,790 | 268 | 2,058 | 1,454 | 605 | - | - | - | - | - | - | - | - | - |
| Period 2f Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 2f.4.1 | Insurance | - | - | - | - | - | - | 530 | 53 | 583 | 583 | - | - | - | - | - | - | - | - | - | - |
| 2f.4.2 | Property taxes | - | - | - | - | - | - | 1,470 | 147 | 1,617 | 1,617 | - | - | - | - | - | - | - | - | - | - |
| 2f.4.3 | Health physics supplies | - | 708 | - | - | - | - | - | 177 | 884 | 884 | - | - | - | - | - | - | - | - | - | - |
| 2f.4.4 | Disposal of DAW generated | - | - | 7 | 4 | - | 29 | - | 9 | 48 | 48 | - | - | 355 | - | - | - | - | 7,097 | 12 | - |
| 2f.4.5 | Plant energy budget | - | - | - | - | - | - | 274 | 41 | 315 | 315 | - | - | - | - | - | - | - | - | - | - |
| 2f.4.6 | NRC Fees | - | - | - | - | - | - | 426 | 43 | 468 | 468 | - | - | - | - | - | - | - | - | - | - |
| 2f.4.7 | Emergency Planning Fees | - | - | - | - | - | - | 112 | 11 | 123 | - | 123 | - | - | - | - | - | - | - | - | - |
| 2f.4.8 | Fixed Overhead | - | - | - | - | - | - | 1,597 | 239 | 1,836 | 1,836 | - | - | - | - | - | - | - | - | - | - |
| 2f.4.9 | ISFSI Operating Costs | - | - | - | - | - | - | 84 | 13 | 97 | - | 97 | - | - | - | - | - | - | - | - | - |
| 2f.4.10 | Railroad Track Maintenance | - | - | - | - | - | - | 94 | 14 | 108 | 108 | - | - | - | - | - | - | - | - | - | - |
| 2f.4.11 | Security Staff Cost | - | - | - | - | - | - | 10,999 | 1,650 | 12,649 | 8,918 | 3,732 | - | - | - | - | - | - | - | - | 162,981 |
| 2f.4.12 | DOC Staff Cost | - | - | - | - | - | - | 5,393 | 809 | 6,201 | 6,201 | - | - | - | - | - | - | - | - | - | 57,200 |
| 2f.4.13 | Utility Staff Cost | - | - | - | - | - | - | 5,762 | 864 | 6,626 | 5,738 | 888 | - | - | - | - | - | - | - | - | 80,707 |
| 2f.4 | Subtotal Period 2f Period-Dependent Costs | - | 708 | 7 | 4 | - | 29 | 26,740 | 4,070 | 31,557 | 26,718 | 4,839 | - | - | 355 | - | - | - | 7,097 | 12 | 300,888 |
| 2f.0 | TOTAL PERIOD 2f COST | - | 708 | 7 | 4 | - | 29 | 35,615 | 6,464 | 42,827 | 37,382 | 5,444 | - | - | 355 | - | - | - | 7,097 | 95,059 | 307,128 |
| PERIOD 2 TOTALS | | 13,731 | 65,566 | 20,473 | 10,731 | 49,937 | 72,577 | 386,033 | 128,758 | 747,806 | 576,287 | 171,445 | 73 | 288,160 | 174,123 | 1,761 | 898 | - | 21,552,260 | 727,310 | 2,393,096 |
| PERIOD 3b - Site Restoration | | | | | | | | | | | | | | | | | | | | | |
| Period 3b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| Demolition of Remaining Site Buildings | | | | | | | | | | | | | | | | | | | | | |
| 3b.1.1.1 | Reactor Building | - | 1,971 | - | - | - | - | - | 296 | 2,267 | - | - | 2,267 | - | - | - | - | - | - | 13,911 | - |
| 3b.1.1.2 | Condensate Tanks Foundation | - | 10 | - | - | - | - | - | 1 | 11 | - | - | 11 | - | - | - | - | - | - | 50 | - |
| 3b.1.1.3 | Discharge Retention Basin | - | 4 | - | - | - | - | - | 1 | 5 | - | - | 5 | - | - | - | - | - | - | 25 | - |
| 3b.1.1.4 | HPCI Room | - | 19 | - | - | - | - | - | 3 | 22 | - | - | 22 | - | - | - | - | - | - | 97 | - |
| 3b.1.1.5 | Hot Shop | - | 16 | - | - | - | - | - | 2 | 19 | - | - | 19 | - | - | - | - | - | - | 177 | - |
| 3b.1.1.6 | Hydrogen & Oxygen Storage | - | 2 | - | - | - | - | - | 0 | 2 | - | - | 2 | - | - | - | - | - | - | 19 | - |
| 3b.1.1.7 | LLRW Storage & Shipping | - | 83 | - | - | - | - | - | 12 | 95 | - | - | 95 | - | - | - | - | - | - | 662 | - |
| 3b.1.1.8 | MSIV | - | 4 | - | - | - | - | - | 1 | 4 | - | - | 4 | - | - | - | - | - | - | 42 | - |
| 3b.1.1.9 | Misc Structures 2017 | - | 1,410 | - | - | - | - | - | 212 | 1,622 | - | - | 1,622 | - | - | - | - | - | - | 13,042 | - |
| 3b.1.1.10 | Offgas Stack | - | 108 | - | - | - | - | - | 16 | 124 | - | - | 124 | - | - | - | - | - | - | 544 | - |
| 3b.1.1.11 | Offgas Storage & Compressor | - | 39 | - | - | - | - | - | 6 | 45 | - | - | 45 | - | - | - | - | - | - | 199 | - |
| 3b.1.1.12 | Radwaste | - | 228 | - | - | - | - | - | 34 | 262 | - | - | 262 | - | - | - | - | - | - | 1,220 | - |
| 3b.1.1.13 | Recombiner | - | 128 | - | - | - | - | - | 19 | 147 | - | - | 147 | - | - | - | - | - | - | 713 | - |
| 3b.1.1.14 | Security Barrier | - | 186 | - | - | - | - | - | 28 | 214 | - | - | 214 | - | - | - | - | - | - | 933 | - |
| 3b.1.1.15 | Structures Greater than 3' Below Grade | - | 2,461 | - | - | - | - | - | 369 | 2,830 | - | - | 2,830 | - | - | - | - | - | - | 12,649 | - |
| 3b.1.1.16 | Tank Farm | - | 4 | - | - | - | - | - | 1 | 5 | - | - | 5 | - | - | - | - | - | - | 21 | - |
| 3b.1.1.17 | Turbine | - | 1,259 | - | - | - | - | - | 189 | 1,448 | - | - | 1,448 | - | - | - | - | - | - | 13,036 | - |
| 3b.1.1.18 | Turbine Building Addition | - | 55 | - | - | - | - | - | 8 | 63 | - | - | 63 | - | - | - | - | - | - | 618 | - |
| 3b.1.1.19 | Turbine Pedestal | - | 182 | - | - | - | - | - | 27 | 209 | - | - | 209 | - | - | - | - | - | - | 926 | - |
| 3b.1.1 | Totals | - | 8,169 | - | - | - | - | - | 1,225 | 9,394 | - | - | 9,394 | - | - | - | - | - | - | 58,885 | - |
| Site Closeout Activities | | | | | | | | | | | | | | | | | | | | | |
| 3b.1.2 | Grade & landscape site | - | 896 | - | - | - | - | - | 134 | 1,031 | - | - | 1,031 | - | - | - | - | - | - | 1,841 | - |
| 3b.1.3 | Final report to NRC | - | - | - | - | - | - | 200 | 30 | 231 | 231 | - | - | - | - | - | - | - | - | - | 1,560 |
| 3b.1 | Subtotal Period 3b Activity Costs | - | 9,065 | - | - | - | - | 200 | 1,390 | 10,655 | 231 | - | 10,425 | - | - | - | - | - | - | 60,726 | 1,560 |

**Monticello Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table C
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with DOE Pickup of Industry Fuel Starting in 2035
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|-----------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| Period 3b Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3b.2.1 | Clean Concrete Disposal | - | 3,322 | - | - | - | - | 13 | 500 | 3,835 | - | - | 3,835 | - | - | - | - | - | - | - | 12 | - |
| 3b.2.2 | Intake Structure Cofferdam | - | 335 | - | - | - | - | - | 50 | 385 | - | - | 385 | - | - | - | - | - | - | - | 2,584 | - |
| 3b.2.3 | Construction Debris | - | - | - | - | - | - | 1,170 | 176 | 1,346 | - | - | 1,346 | - | - | - | - | - | - | - | - | - |
| 3b.2.4 | Backfill | - | 5,583 | - | - | - | - | - | 837 | 6,421 | - | - | 6,421 | - | - | - | - | - | - | - | 5,422 | - |
| 3b.2.5 | Discharge Structure Cofferdam | - | 442 | - | - | - | - | - | 66 | 508 | - | - | 508 | - | - | - | - | - | - | - | 3,552 | - |
| 3b.2 | Subtotal Period 3b Additional Costs | - | 9,682 | - | - | - | - | 1,183 | 1,630 | 12,495 | - | - | 12,495 | - | - | - | - | - | - | - | 11,570 | - |
| Period 3b Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3b.3.1 | Small tool allowance | - | 110 | - | - | - | - | - | 17 | 127 | - | - | 127 | - | - | - | - | - | - | - | - | - |
| 3b.3.2 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 5,601 | 840 | 6,442 | - | 6,442 | - | - | - | - | - | - | - | - | - | - |
| 3b.3 | Subtotal Period 3b Collateral Costs | - | 110 | - | - | - | - | 5,601 | 857 | 6,568 | - | 6,442 | 127 | - | - | - | - | - | - | - | - | - |
| Period 3b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3b.4.1 | Insurance | - | - | - | - | - | - | 1,220 | 122 | 1,342 | 1,342 | - | - | - | - | - | - | - | - | - | - | - |
| 3b.4.2 | Property taxes | - | - | - | - | - | - | 2,540 | 254 | 2,794 | - | 2,794 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.3 | Heavy equipment rental | - | 5,842 | - | - | - | - | - | 876 | 6,719 | - | - | 6,719 | - | - | - | - | - | - | - | - | - |
| 3b.4.4 | Plant energy budget | - | - | - | - | - | - | 315 | 47 | 362 | - | 362 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.5 | NRC ISFSI Fees | - | - | - | - | - | - | 356 | 36 | 391 | - | 391 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.6 | Emergency Planning Fees | - | - | - | - | - | - | 257 | 26 | 283 | - | 283 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.7 | Fixed Overhead | - | - | - | - | - | - | 1,122 | 168 | 1,290 | 429 | 860 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.8 | ISFSI Operating Costs | - | - | - | - | - | - | 194 | 29 | 223 | - | 223 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.9 | Railroad Track Maintenance | - | - | - | - | - | - | 543 | 81 | 624 | 249 | 375 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.10 | Security Staff Cost | - | - | - | - | - | - | 25,319 | 3,798 | 29,117 | 0 | 8,589 | 20,527 | - | - | - | - | - | - | - | - | 375,152 |
| 3b.4.11 | DOC Staff Cost | - | - | - | - | - | - | 11,729 | 1,759 | 13,489 | - | - | 13,489 | - | - | - | - | - | - | - | - | 122,646 |
| 3b.4.12 | Utility Staff Cost | - | - | - | - | - | - | 6,873 | 1,031 | 7,904 | - | 2,047 | 5,857 | - | - | - | - | - | - | - | - | 98,297 |
| 3b.4 | Subtotal Period 3b Period-Dependent Costs | - | 5,842 | - | - | - | - | 50,467 | 8,228 | 64,537 | 2,020 | 15,926 | 46,591 | - | - | - | - | - | - | - | - | 596,095 |
| 3b.0 | TOTAL PERIOD 3b COST | - | 24,700 | - | - | - | - | 57,452 | 12,104 | 94,255 | 2,251 | 22,367 | 69,638 | - | - | - | - | - | - | - | 72,296 | 597,655 |
| PERIOD 3c - Fuel Storage Operations/Shipping | | | | | | | | | | | | | | | | | | | | | | |
| Period 3c Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Period 3c Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3c.3.1 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 35,783 | 5,367 | 41,150 | - | 41,150 | - | - | - | - | - | - | - | - | - | - |
| 3c.3 | Subtotal Period 3c Collateral Costs | - | - | - | - | - | - | 35,783 | 5,367 | 41,150 | - | 41,150 | - | - | - | - | - | - | - | - | - | - |
| Period 3c Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3c.4.1 | Insurance | - | - | - | - | - | - | 24,661 | 2,466 | 27,127 | - | 27,127 | - | - | - | - | - | - | - | - | - | - |
| 3c.4.2 | Property taxes | - | - | - | - | - | - | 31,866 | 3,187 | 35,053 | - | 35,053 | - | - | - | - | - | - | - | - | - | - |
| 3c.4.4 | NRC ISFSI Fees | - | - | - | - | - | - | 9,642 | 964 | 10,606 | - | 10,606 | - | - | - | - | - | - | - | - | - | - |
| 3c.4.5 | Emergency Planning Fees | - | - | - | - | - | - | 5,199 | 520 | 5,718 | - | 5,718 | - | - | - | - | - | - | - | - | - | - |
| 3c.4.6 | Fixed Overhead | - | - | - | - | - | - | 7,552 | 1,133 | 8,685 | - | 8,685 | - | - | - | - | - | - | - | - | - | - |
| 3c.4.7 | ISFSI Operating Costs | - | - | - | - | - | - | 3,925 | 589 | 4,513 | - | 4,513 | - | - | - | - | - | - | - | - | - | - |
| 3c.4.8 | Railroad Track Maintenance | - | - | - | - | - | - | 4,384 | 658 | 5,042 | - | 5,042 | - | - | - | - | - | - | - | - | - | - |
| 3c.4.9 | Security Staff Cost | - | - | - | - | - | - | 150,798 | 22,620 | 173,418 | - | 173,418 | - | - | - | - | - | - | - | - | - | 1,896,208 |
| 3c.4.10 | Utility Staff Cost | - | - | - | - | - | - | 36,023 | 5,403 | 41,427 | - | 41,427 | - | - | - | - | - | - | - | - | - | 492,285 |
| 3c.4 | Subtotal Period 3c Period-Dependent Costs | - | - | - | - | - | - | 274,051 | 37,539 | 311,590 | - | 311,590 | - | - | - | - | - | - | - | - | - | 2,388,493 |
| 3c.0 | TOTAL PERIOD 3c COST | - | - | - | - | - | - | 309,834 | 42,907 | 352,740 | - | 352,740 | - | - | - | - | - | - | - | - | - | 2,388,493 |
| PERIOD 3d - GTCC shipping | | | | | | | | | | | | | | | | | | | | | | |
| Period 3d Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Nuclear Steam Supply System Removal | | | | | | | | | | | | | | | | | | | | | | |
| 3d.1.1.1 | Vessel & Internals GTCC Disposal | - | - | 1,083 | - | - | 4,313 | - | 918 | 6,314 | 6,314 | - | - | - | - | - | - | 1,160 | 225,765 | - | - | - |
| 3d.1.1 | Totals | - | - | 1,083 | - | - | 4,313 | - | 918 | 6,314 | 6,314 | - | - | - | - | - | - | 1,160 | 225,765 | - | - | - |
| 3d.1 | Subtotal Period 3d Activity Costs | - | - | 1,083 | - | - | 4,313 | - | 918 | 6,314 | 6,314 | - | - | - | - | - | - | 1,160 | 225,765 | - | - | - |
| Period 3d Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3d.3.1 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 55 | 8 | 64 | - | 64 | - | - | - | - | - | - | - | - | - | - |
| 3d.3 | Subtotal Period 3d Collateral Costs | - | - | - | - | - | - | 55 | 8 | 64 | - | 64 | - | - | - | - | - | - | - | - | - | - |

**Monticello Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table C
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with DOE Pickup of Industry Fuel Starting in 2035
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|--------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| Period 3d Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3d.4.1 | Insurance | - | - | - | - | - | - | 27 | 3 | 30 | 30 | - | - | - | - | - | - | - | - | - | - | |
| 3d.4.2 | Property taxes | - | - | - | - | - | - | 35 | 3 | 38 | 38 | - | - | - | - | - | - | - | - | - | - | |
| 3d.4.4 | NRC ISFSI Fees | - | - | - | - | - | - | 8 | 1 | 9 | - | 9 | - | - | - | - | - | - | - | - | - | |
| 3d.4.5 | Emergency Planning Fees | - | - | - | - | - | - | 6 | 1 | 6 | - | 6 | - | - | - | - | - | - | - | - | - | |
| 3d.4.6 | Fixed Overhead | - | - | - | - | - | - | 8 | 1 | 10 | 10 | - | - | - | - | - | - | - | - | - | - | |
| 3d.4.7 | Railroad Track Maintenance | - | - | - | - | - | - | 5 | 1 | 6 | 6 | - | - | - | - | - | - | - | - | - | - | |
| 3d.4.8 | Security Staff Cost | - | - | - | - | - | - | 165 | 25 | 190 | 190 | - | - | - | - | - | - | - | - | - | 2,074 | |
| 3d.4.9 | Utility Staff Cost | - | - | - | - | - | - | 39 | 6 | 45 | 45 | - | - | - | - | - | - | - | - | - | 539 | |
| 3d.4 | Subtotal Period 3d Period-Dependent Costs | - | - | - | - | - | - | 293 | 40 | 333 | 318 | 15 | - | - | - | - | - | - | - | - | 2,613 | |
| 3d.0 | TOTAL PERIOD 3d COST | - | - | 1,083 | - | - | 4,313 | 348 | 966 | 6,710 | 6,632 | 78 | - | - | - | - | - | 1,160 | 225,765 | - | 2,613 | |
| PERIOD 3e - ISFSI Decontamination | | | | | | | | | | | | | | | | | | | | | | |
| Period 3e Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Period 3e Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3e.2.1 | License Termination ISFSI | - | 57 | 188 | 987 | - | 5,925 | 2,013 | 2,292 | 11,462 | 11,462 | - | - | - | 21,949 | - | - | - | - | 2,633,402 | 10,339 | 2,201 |
| 3e.2 | Subtotal Period 3e Additional Costs | - | 57 | 188 | 987 | - | 5,925 | 2,013 | 2,292 | 11,462 | 11,462 | - | - | - | 21,949 | - | - | - | - | 2,633,402 | 10,339 | 2,201 |
| Period 3e Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3e.4.1 | Insurance | - | - | - | - | - | - | 118 | 30 | 148 | 148 | - | - | - | - | - | - | - | - | - | - | |
| 3e.4.2 | Property taxes | - | - | - | - | - | - | 249 | 62 | 312 | 312 | - | - | - | - | - | - | - | - | - | - | |
| 3e.4.3 | Plant energy budget | - | - | - | - | - | - | 12 | 3 | 15 | 15 | - | - | - | - | - | - | - | - | - | - | |
| 3e.4.4 | Fixed Overhead | - | - | - | - | - | - | 71 | 18 | 89 | 89 | - | - | - | - | - | - | - | - | - | - | |
| 3e.4.5 | Railroad Track Maintenance | - | - | - | - | - | - | 41 | 10 | 52 | 52 | - | - | - | - | - | - | - | - | - | - | |
| 3e.4.6 | Security Staff Cost | - | - | - | - | - | - | 352 | 88 | 440 | 440 | - | - | - | - | - | - | - | - | - | 4,999 | |
| 3e.4.7 | Utility Staff Cost | - | - | - | - | - | - | 261 | 65 | 326 | 326 | - | - | - | - | - | - | - | - | - | 3,792 | |
| 3e.4 | Subtotal Period 3e Period-Dependent Costs | - | - | - | - | - | - | 1,105 | 276 | 1,381 | 1,381 | - | - | - | - | - | - | - | - | - | 8,792 | |
| 3e.0 | TOTAL PERIOD 3e COST | - | 57 | 188 | 987 | - | 5,925 | 3,118 | 2,569 | 12,844 | 12,844 | - | - | - | 21,949 | - | - | - | - | 2,633,402 | 10,339 | 10,993 |
| PERIOD 3f - ISFSI Site Restoration | | | | | | | | | | | | | | | | | | | | | | |
| Period 3f Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Period 3f Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3f.2.1 | Demolition and Site Restoration of ISFSI | - | 1,486 | - | - | - | - | 233 | 258 | 1,977 | - | - | 1,977 | - | - | - | - | - | - | - | 6,957 | 160 |
| 3f.2 | Subtotal Period 3f Additional Costs | - | 1,486 | - | - | - | - | 233 | 258 | 1,977 | - | - | 1,977 | - | - | - | - | - | - | - | 6,957 | 160 |
| Period 3f Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3f.3.1 | Small tool allowance | - | 10 | - | - | - | - | - | 2 | 12 | - | - | 12 | - | - | - | - | - | - | - | - | - |
| 3f.3 | Subtotal Period 3f Collateral Costs | - | 10 | - | - | - | - | - | 2 | 12 | - | - | 12 | - | - | - | - | - | - | - | - | - |
| Period 3f Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3f.4.2 | Property taxes | - | - | - | - | - | - | 126 | 13 | 138 | - | - | 138 | - | - | - | - | - | - | - | - | - |
| 3f.4.3 | Heavy equipment rental | - | 117 | - | - | - | - | - | 17 | 134 | - | - | 134 | - | - | - | - | - | - | - | - | - |
| 3f.4.4 | Plant energy budget | - | - | - | - | - | - | 6 | 1 | 7 | - | - | 7 | - | - | - | - | - | - | - | - | |
| 3f.4.5 | Fixed Overhead | - | - | - | - | - | - | 36 | 5 | 41 | - | - | 41 | - | - | - | - | - | - | - | - | |
| 3f.4.6 | Railroad Track Maintenance | - | - | - | - | - | - | 21 | 3 | 24 | - | - | 24 | - | - | - | - | - | - | - | - | |
| 3f.4.7 | Security Staff Cost | - | - | - | - | - | - | 177 | 27 | 204 | - | - | 204 | - | - | - | - | - | - | - | 2,520 | |
| 3f.4.8 | Utility Staff Cost | - | - | - | - | - | - | 109 | 16 | 126 | - | - | 126 | - | - | - | - | - | - | - | 1,564 | |
| 3f.4 | Subtotal Period 3f Period-Dependent Costs | - | 117 | - | - | - | - | 475 | 82 | 674 | - | - | 674 | - | - | - | - | - | - | - | 4,084 | |
| 3f.0 | TOTAL PERIOD 3f COST | - | 1,613 | - | - | - | - | 709 | 342 | 2,663 | - | - | 2,663 | - | - | - | - | - | - | - | 6,957 | 4,244 |
| PERIOD 3 TOTALS | | | | | | | | | | | | | | | | | | | | | | |
| TOTAL COST TO DECOMMISSION | | | | | | | | | | | | | | | | | | | | | | |
| | | 17,263 | 95,223 | 21,839 | 11,878 | 49,952 | 84,523 | 911,797 | 212,629 | 1,405,104 | 776,139 | 555,579 | 73,386 | 288,203 | 197,270 | 1,992 | 898 | 1,160 | 24,474,580 | 848,750 | 6,589,608 | |

**Monticello Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table C
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with DOE Pickup of Industry Fuel Starting in 2035
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|----------------|----------------------|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |

| | | | | | | | | | | | | | | | | | | | | | | |
|--|--|--|--|--|-------------|---------------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| TOTAL COST TO DECOMMISSION WITH 17.83% CONTINGENCY: | | | | | \$1,405,104 | thousands of 2020 dollars | | | | | | | | | | | | | | | | |
| TOTAL NRC LICENSE TERMINATION COST IS 55.24% OR: | | | | | \$776,139 | thousands of 2020 dollars | | | | | | | | | | | | | | | | |
| SPENT FUEL MANAGEMENT COST IS 39.54% OR: | | | | | \$555,579 | thousands of 2020 dollars | | | | | | | | | | | | | | | | |
| NON-NUCLEAR DEMOLITION COST IS 5.22% OR: | | | | | \$73,386 | thousands of 2020 dollars | | | | | | | | | | | | | | | | |
| TOTAL LOW-LEVEL RADIOACTIVE WASTE VOLUME BURIED (EXCLUDING GTCC): | | | | | 200,160 | Cubic Feet | | | | | | | | | | | | | | | | |
| TOTAL GREATER THAN CLASS C RADWASTE VOLUME GENERATED: | | | | | 1,160 | Cubic Feet | | | | | | | | | | | | | | | | |
| TOTAL SCRAP METAL REMOVED: | | | | | 23,123 | Tons | | | | | | | | | | | | | | | | |
| TOTAL CRAFT LABOR REQUIREMENTS: | | | | | 848,750 | Man-hours | | | | | | | | | | | | | | | | |

End Notes:
n/a - indicates that this activity not charged as decommissioning expense
a - indicates that this activity performed by decommissioning staff
0 - indicates that this value is less than 0.5 but is non-zero
A cell containing " - " indicates a zero value

***Monticello Nuclear Generating Plant
Decommissioning Cost Analysis***

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APPENDIX D

DETAILED COST ANALYSIS

SCENARIO 2: DECON with 60 Year DFS

**Monticello Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table D
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|--|--|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| PERIOD 1a - Shutdown through Transition | | | | | | | | | | | | | | | | | | | | | |
| Period 1a Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| 1a.1.1 | Prepare preliminary decommissioning cost | - | - | - | - | - | - | 167 | 25 | 192 | 192 | - | - | - | - | - | - | - | - | - | 1,300 |
| 1a.1.2 | Notification of Cessation of Operations | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.3 | Remove fuel & source material | - | - | - | - | - | - | - | - | n/a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.4 | Notification of Permanent Defueling | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.5 | Deactivate plant systems & process waste | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.6 | Prepare and submit PSDAR | - | - | - | - | - | - | 257 | 39 | 296 | 296 | - | - | - | - | - | - | - | - | - | 2,000 |
| 1a.1.7 | Review plant dwgs & specs. | - | - | - | - | - | - | 591 | 89 | 680 | 680 | - | - | - | - | - | - | - | - | - | 4,600 |
| 1a.1.8 | Perform detailed rad survey | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.9 | Estimate by-product inventory | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| 1a.1.10 | End product description | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| 1a.1.11 | Detailed by-product inventory | - | - | - | - | - | - | 167 | 25 | 192 | 192 | - | - | - | - | - | - | - | - | - | 1,300 |
| 1a.1.12 | Define major work sequence | - | - | - | - | - | - | 964 | 145 | 1,108 | 1,108 | - | - | - | - | - | - | - | - | - | 7,500 |
| 1a.1.13 | Perform SER and EA | - | - | - | - | - | - | 398 | 60 | 458 | 458 | - | - | - | - | - | - | - | - | - | 3,100 |
| 1a.1.14 | Prepare/submit Defueled Technical Specifications | - | - | - | - | - | - | 964 | 145 | 1,108 | 1,108 | - | - | - | - | - | - | - | - | - | 7,500 |
| 1a.1.15 | Perform Site-Specific Cost Study | - | - | - | - | - | - | 643 | 96 | 739 | 739 | - | - | - | - | - | - | - | - | - | 5,000 |
| 1a.1.16 | Prepare/submit Irradiated Fuel Management Plan | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| Activity Specifications | | | | | | | | | | | | | | | | | | | | | |
| 1a.1.17.1 | Plant & temporary facilities | - | - | - | - | - | - | 632 | 95 | 727 | 654 | - | 73 | - | - | - | - | - | - | - | 4,920 |
| 1a.1.17.2 | Plant systems | - | - | - | - | - | - | 536 | 80 | 616 | 554 | - | 62 | - | - | - | - | - | - | - | 4,167 |
| 1a.1.17.3 | NSSS Decontamination Flush | - | - | - | - | - | - | 64 | 10 | 74 | 74 | - | - | - | - | - | - | - | - | - | 500 |
| 1a.1.17.4 | Reactor internals | - | - | - | - | - | - | 912 | 137 | 1,049 | 1,049 | - | - | - | - | - | - | - | - | - | 7,100 |
| 1a.1.17.5 | Reactor vessel | - | - | - | - | - | - | 835 | 125 | 961 | 961 | - | - | - | - | - | - | - | - | - | 6,500 |
| 1a.1.17.6 | Sacrificial shield | - | - | - | - | - | - | 64 | 10 | 74 | 74 | - | - | - | - | - | - | - | - | - | 500 |
| 1a.1.17.7 | Moisture separators/reheaters | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| 1a.1.17.8 | Reinforced concrete | - | - | - | - | - | - | 206 | 31 | 236 | 118 | - | 118 | - | - | - | - | - | - | - | 1,600 |
| 1a.1.17.9 | Main Turbine | - | - | - | - | - | - | 268 | 40 | 309 | 309 | - | - | - | - | - | - | - | - | - | 2,088 |
| 1a.1.17.10 | Main Condensers | - | - | - | - | - | - | 268 | 40 | 309 | 309 | - | - | - | - | - | - | - | - | - | 2,088 |
| 1a.1.17.11 | Pressure suppression structure | - | - | - | - | - | - | 257 | 39 | 296 | 296 | - | - | - | - | - | - | - | - | - | 2,000 |
| 1a.1.17.12 | Drywell | - | - | - | - | - | - | 206 | 31 | 236 | 236 | - | - | - | - | - | - | - | - | - | 1,600 |
| 1a.1.17.13 | Plant structures & buildings | - | - | - | - | - | - | 401 | 60 | 461 | 231 | - | 231 | - | - | - | - | - | - | - | 3,120 |
| 1a.1.17.14 | Waste management | - | - | - | - | - | - | 591 | 89 | 680 | 680 | - | - | - | - | - | - | - | - | - | 4,600 |
| 1a.1.17.15 | Facility & site closeout | - | - | - | - | - | - | 116 | 17 | 133 | 67 | - | 67 | - | - | - | - | - | - | - | 900 |
| 1a.1.17 | Total | - | - | - | - | - | - | 5,486 | 823 | 6,308 | 5,759 | - | 550 | - | - | - | - | - | - | - | 42,683 |
| Planning & Site Preparations | | | | | | | | | | | | | | | | | | | | | |
| 1a.1.18 | Prepare dismantling sequence | - | - | - | - | - | - | 308 | 46 | 355 | 355 | - | - | - | - | - | - | - | - | - | 2,400 |
| 1a.1.19 | Plant prep. & temp. svces | - | - | - | - | - | - | 3,500 | 525 | 4,025 | 4,025 | - | - | - | - | - | - | - | - | - | - |
| 1a.1.20 | Design water clean-up system | - | - | - | - | - | - | 180 | 27 | 207 | 207 | - | - | - | - | - | - | - | - | - | 1,400 |
| 1a.1.21 | Rigging/Cont. Cntrl Envlps/tooling/etc. | - | - | - | - | - | - | 2,400 | 360 | 2,760 | 2,760 | - | - | - | - | - | - | - | - | - | - |
| 1a.1.22 | Procure casks/liners & containers | - | - | - | - | - | - | 158 | 24 | 182 | 182 | - | - | - | - | - | - | - | - | - | 1,230 |
| 1a.1 | Subtotal Period 1a Activity Costs | - | - | - | - | - | - | 16,569 | 2,485 | 19,054 | 18,505 | - | 550 | - | - | - | - | - | - | - | 83,013 |
| Period 1a Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 1a.3.1 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 1,323 | 198 | 1,522 | - | 1,522 | - | - | - | - | - | - | - | - | - |
| 1a.3.2 | Retention and Severance | - | - | - | - | - | - | 9,892 | 1,484 | 11,376 | 11,376 | - | - | - | - | - | - | - | - | - | - |
| 1a.3 | Subtotal Period 1a Collateral Costs | - | - | - | - | - | - | 11,215 | 1,682 | 12,897 | 11,376 | 1,522 | - | - | - | - | - | - | - | - | - |
| Period 1a Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 1a.4.1 | Insurance | - | - | - | - | - | - | 2,328 | 233 | 2,561 | 2,561 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.2 | Property taxes | - | - | - | - | - | - | 3,570 | 357 | 3,927 | 3,927 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.3 | Health physics supplies | - | 614 | - | - | - | - | - | 153 | 767 | 767 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.4 | Heavy equipment rental | - | 753 | - | - | - | - | - | 113 | 866 | 866 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.5 | Disposal of DAW generated | - | - | 12 | 6 | - | 50 | - | 15 | 83 | 83 | - | - | 610 | - | - | - | - | 12,190 | 20 | - |
| 1a.4.6 | Plant energy budget | - | - | - | - | - | - | 1,817 | 272 | 2,089 | 2,089 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.7 | NRC Fees | - | - | - | - | - | - | 1,137 | 114 | 1,251 | 1,251 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.8 | Emergency Planning Fees | - | - | - | - | - | - | 3,428 | 343 | 3,770 | - | 3,770 | - | - | - | - | - | - | - | - | - |
| 1a.4.9 | Fixed Overhead | - | - | - | - | - | - | 2,616 | 392 | 3,009 | 3,009 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.10 | Spent Fuel Pool O&M | - | - | - | - | - | - | 845 | 127 | 971 | - | 971 | - | - | - | - | - | - | - | - | - |
| 1a.4.11 | ISFSI Operating Costs | - | - | - | - | - | - | 112 | 17 | 129 | - | 129 | - | - | - | - | - | - | - | - | - |
| 1a.4.12 | Railroad Track Maintenance | - | - | - | - | - | - | 125 | 19 | 144 | 144 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.13 | Security Staff Cost | - | - | - | - | - | - | 16,372 | 2,456 | 18,827 | 18,827 | - | - | - | - | - | - | - | - | - | 245,440 |
| 1a.4.14 | Utility Staff Cost | - | - | - | - | - | - | 27,285 | 4,093 | 31,378 | 31,378 | - | - | - | - | - | - | - | - | - | 422,240 |
| 1a.4 | Subtotal Period 1a Period-Dependent Costs | - | 1,367 | 12 | 6 | - | 50 | 59,634 | 8,703 | 69,772 | 64,902 | 4,870 | - | 610 | - | - | - | - | 12,190 | 20 | 667,680 |

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**Table D
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DECON Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|--|--------------|--------------|-----------------|-----------------|---------------------------|---------------------|----------------|-------------------|----------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| 1a.0 | TOTAL PERIOD 1a COST | - | 1,367 | 12 | 6 | - | 50 | 87,418 | 12,871 | 101,724 | 94,783 | 6,392 | 550 | - | 610 | - | - | - | 12,190 | 20 | 750,693 |
| PERIOD 1b - Decommissioning Preparations | | | | | | | | | | | | | | | | | | | | | |
| Period 1b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| Detailed Work Procedures | | | | | | | | | | | | | | | | | | | | | |
| 1b.1.1.1 | Plant systems | - | - | - | - | - | - | 608 | 91 | 700 | 630 | - | 70 | - | - | - | - | - | - | - | 4,733 |
| 1b.1.1.2 | NSSS Decontamination Flush | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| 1b.1.1.3 | Reactor internals | - | - | - | - | - | - | 514 | 77 | 591 | 591 | - | - | - | - | - | - | - | - | - | 4,000 |
| 1b.1.1.4 | Remaining buildings | - | - | - | - | - | - | 174 | 26 | 200 | 50 | - | 150 | - | - | - | - | - | - | - | 1,350 |
| 1b.1.1.5 | CRD housings & NIs | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| 1b.1.1.6 | Incore instrumentation | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| 1b.1.1.7 | Removal primary containment | - | - | - | - | - | - | 257 | 39 | 296 | 296 | - | - | - | - | - | - | - | - | - | 2,000 |
| 1b.1.1.8 | Reactor vessel | - | - | - | - | - | - | 467 | 70 | 537 | 537 | - | - | - | - | - | - | - | - | - | 3,630 |
| 1b.1.1.9 | Facility closeout | - | - | - | - | - | - | 154 | 23 | 177 | 89 | - | 89 | - | - | - | - | - | - | - | 1,200 |
| 1b.1.1.10 | Sacrificial shield | - | - | - | - | - | - | 154 | 23 | 177 | 177 | - | - | - | - | - | - | - | - | - | 1,200 |
| 1b.1.1.11 | Reinforced concrete | - | - | - | - | - | - | 129 | 19 | 148 | 74 | - | 74 | - | - | - | - | - | - | - | 1,000 |
| 1b.1.1.12 | Main Turbine | - | - | - | - | - | - | 267 | 40 | 307 | 307 | - | - | - | - | - | - | - | - | - | 2,080 |
| 1b.1.1.13 | Main Condensers | - | - | - | - | - | - | 268 | 40 | 309 | 309 | - | - | - | - | - | - | - | - | - | 2,088 |
| 1b.1.1.14 | Moisture separators & reheaters | - | - | - | - | - | - | 257 | 39 | 296 | 296 | - | - | - | - | - | - | - | - | - | 2,000 |
| 1b.1.1.15 | Radwaste building | - | - | - | - | - | - | 351 | 53 | 403 | 363 | - | 40 | - | - | - | - | - | - | - | 2,730 |
| 1b.1.1.16 | Reactor building | - | - | - | - | - | - | 351 | 53 | 403 | 363 | - | 40 | - | - | - | - | - | - | - | 2,730 |
| 1b.1.1 | Total | - | - | - | - | - | - | 4,336 | 650 | 4,987 | 4,524 | - | 463 | - | - | - | - | - | - | - | 33,741 |
| 1b.1.2 | Decon NSSS | 296 | - | - | - | - | - | - | 148 | 444 | 444 | - | - | - | - | - | - | - | - | 1,067 | - |
| 1b.1 | Subtotal Period 1b Activity Costs | 296 | - | - | - | - | - | 4,336 | 798 | 5,431 | 4,968 | - | 463 | - | - | - | - | - | - | 1,067 | 33,741 |
| Period 1b Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 1b.2.1 | Spent Fuel Pool Isolation | - | - | - | - | - | - | 12,675 | 1,901 | 14,576 | 14,576 | - | - | - | - | - | - | - | - | - | - |
| 1b.2.2 | Site Characterization | - | - | - | - | - | - | 5,930 | 1,779 | 7,708 | 7,708 | - | - | - | - | - | - | - | - | - | 30,500 |
| 1b.2.3 | Mixed & RCRA Waste | - | - | 28 | 29 | 14 | - | - | 9 | 80 | 80 | - | - | 43 | - | - | - | - | 5,253 | 161 | 10,852 |
| 1b.2 | Subtotal Period 1b Additional Costs | - | - | 28 | 29 | 14 | - | 18,605 | 3,689 | 22,365 | 22,365 | - | - | 43 | - | - | - | - | 5,253 | 30,661 | 10,852 |
| Period 1b Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 1b.3.1 | Decon equipment | 1,055 | - | - | - | - | - | - | 158 | 1,213 | 1,213 | - | - | - | - | - | - | - | - | - | - |
| 1b.3.2 | DOC staff relocation expenses | - | - | - | - | - | - | 1,264 | 190 | 1,454 | 1,454 | - | - | - | - | - | - | - | - | - | - |
| 1b.3.3 | Process decommissioning water waste | 38 | - | 25 | 45 | - | 102 | - | 53 | 263 | 263 | - | - | - | 233 | - | - | - | - | 13,991 | 45 |
| 1b.3.4 | Process decommissioning chemical flush waste | 1 | - | 24 | 77 | - | 1,526 | - | 396 | 2,024 | 2,024 | - | - | - | - | 231 | - | - | - | 24,599 | 43 |
| 1b.3.5 | Small tool allowance | - | 2 | - | - | - | - | - | 0 | 2 | 2 | - | - | - | - | - | - | - | - | - | - |
| 1b.3.6 | Pipe cutting equipment | - | 1,200 | - | - | - | - | - | 180 | 1,380 | 1,380 | - | - | - | - | - | - | - | - | - | - |
| 1b.3.7 | Decon rig | 2,104 | - | - | - | - | - | - | 316 | 2,419 | 2,419 | - | - | - | - | - | - | - | - | - | - |
| 1b.3.8 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 391 | 59 | 450 | - | 450 | - | - | - | - | - | - | - | - | - |
| 1b.3.9 | Retention and Severance | - | - | - | - | - | - | 6,335 | 950 | 7,285 | 7,285 | - | - | - | - | - | - | - | - | - | - |
| 1b.3 | Subtotal Period 1b Collateral Costs | 3,197 | 1,202 | 49 | 122 | - | 1,628 | 7,990 | 2,302 | 16,490 | 16,040 | 450 | - | - | 233 | 231 | - | - | 38,589 | 89 | - |
| Period 1b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 1b.4.1 | Decon supplies | 39 | - | - | - | - | - | - | 10 | 48 | 48 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.2 | Insurance | - | - | - | - | - | - | 1,161 | 116 | 1,277 | 1,277 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.3 | Property taxes | - | - | - | - | - | - | 1,709 | 171 | 1,880 | 1,880 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.4 | Health physics supplies | - | 344 | - | - | - | - | - | 86 | 430 | 430 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.5 | Heavy equipment rental | - | 375 | - | - | - | - | - | 56 | 432 | 432 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.6 | Disposal of DAW generated | - | - | 7 | 4 | - | 29 | - | 9 | 49 | 49 | - | - | - | 356 | - | - | - | 7,122 | 12 | - |
| 1b.4.7 | Plant energy budget | - | - | - | - | - | - | 1,812 | 272 | 2,083 | 2,083 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.8 | NRC Fees | - | - | - | - | - | - | 323 | 32 | 355 | 355 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.9 | Emergency Planning Fees | - | - | - | - | - | - | 1,416 | 142 | 1,557 | - | 1,557 | - | - | - | - | - | - | - | - | - |
| 1b.4.10 | Fixed Overhead | - | - | - | - | - | - | 1,305 | 196 | 1,500 | 1,500 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.11 | Spent Fuel Pool O&M | - | - | - | - | - | - | 421 | 63 | 484 | - | 484 | - | - | - | - | - | - | - | - | - |
| 1b.4.12 | ISFSI Operating Costs | - | - | - | - | - | - | 56 | 8 | 64 | - | 64 | - | - | - | - | - | - | - | - | - |
| 1b.4.13 | Railroad Track Maintenance | - | - | - | - | - | - | 62 | 9 | 72 | 72 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.14 | Security Staff Cost | - | - | - | - | - | - | 8,163 | 1,225 | 9,388 | 9,388 | - | - | - | - | - | - | - | - | - | 122,384 |
| 1b.4.15 | DOC Staff Cost | - | - | - | - | - | - | 5,846 | 877 | 6,723 | 6,723 | - | - | - | - | - | - | - | - | - | 63,266 |
| 1b.4.16 | Utility Staff Cost | - | - | - | - | - | - | 13,682 | 2,052 | 15,734 | 15,734 | - | - | - | - | - | - | - | - | - | 211,579 |
| 1b.4 | Subtotal Period 1b Period-Dependent Costs | 39 | 719 | 7 | 4 | - | 29 | 35,955 | 5,323 | 42,076 | 39,970 | 2,106 | - | - | 356 | - | - | - | 7,122 | 12 | 397,229 |
| 1b.0 | TOTAL PERIOD 1b COST | 3,531 | 1,921 | 84 | 154 | 14 | 1,657 | 66,886 | 12,113 | 86,361 | 83,343 | 2,556 | 463 | 43 | 589 | 231 | - | - | 50,964 | 31,828 | 441,822 |
| PERIOD 1 TOTALS | | 3,531 | 3,288 | 96 | 160 | 14 | 1,707 | 154,304 | 24,984 | 188,085 | 178,125 | 8,948 | 1,012 | 43 | 1,199 | 231 | - | - | 63,155 | 31,848 | 1,192,515 |

**Monticello Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table D
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|--|--|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| PERIOD 2a - Large Component Removal | | | | | | | | | | | | | | | | | | | | | |
| Period 2a Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| Nuclear Steam Supply System Removal | | | | | | | | | | | | | | | | | | | | | |
| 2a.1.1.1 | Recirculation System Piping & Valves | 111 | 94 | 27 | 50 | - | 528 | - | 221 | 1,031 | 1,031 | - | - | - | 1,430 | - | - | - | 99,742 | 2,905 | - |
| 2a.1.1.2 | Recirculation Pumps & Motors | 40 | 63 | 16 | 51 | 42 | 539 | - | 186 | 938 | 938 | - | - | 96 | 945 | - | - | - | 112,200 | 1,563 | - |
| 2a.1.1.3 | CRDMs & NIs Removal | 194 | 1,020 | 415 | 135 | - | 1,130 | - | 696 | 3,591 | 3,591 | - | - | - | 3,741 | - | - | - | 213,700 | 17,768 | - |
| 2a.1.1.4 | Reactor Vessel Internals | 244 | 6,722 | 12,852 | 2,696 | - | 29,845 | 364 | 24,027 | 76,749 | 76,749 | - | - | - | 1,252 | 1,761 | 898 | - | 343,150 | 30,515 | 1,379 |
| 2a.1.1.5 | Reactor Vessel | 113 | 9,121 | 2,672 | 1,167 | - | 5,861 | 364 | 10,842 | 30,140 | 30,140 | - | - | - | 16,169 | - | - | - | 1,105,210 | 30,515 | 1,379 |
| 2a.1.1 | Totals | 702 | 17,020 | 15,982 | 4,099 | 42 | 37,903 | 728 | 35,973 | 112,449 | 112,449 | - | - | 96 | 23,536 | 1,761 | 898 | - | 1,874,002 | 83,267 | 2,758 |
| Removal of Major Equipment | | | | | | | | | | | | | | | | | | | | | |
| 2a.1.2 | Main Turbine/Generator | - | 385 | 1,356 | 521 | 6,139 | 439 | - | 1,341 | 10,182 | 10,182 | - | - | 24,835 | 1,383 | - | - | - | 1,577,959 | 5,438 | - |
| 2a.1.3 | Main Condensers | - | 1,347 | 360 | 194 | 3,225 | 244 | - | 947 | 6,317 | 6,317 | - | - | 17,396 | 727 | - | - | - | 828,955 | 18,831 | - |
| Cascading Costs from Clean Building Demolition | | | | | | | | | | | | | | | | | | | | | |
| 2a.1.4.1 | Reactor Building | - | 332 | - | - | - | - | - | 50 | 381 | 381 | - | - | - | - | - | - | - | - | 2,217 | - |
| 2a.1.4.2 | Radwaste | - | 25 | - | - | - | - | - | 4 | 28 | 28 | - | - | - | - | - | - | - | - | 127 | - |
| 2a.1.4.3 | Turbine | - | 127 | - | - | - | - | - | 19 | 146 | 146 | - | - | - | - | - | - | - | - | 1,254 | - |
| 2a.1.4 | Totals | - | 483 | - | - | - | - | - | 72 | 556 | 556 | - | - | - | - | - | - | - | - | 3,598 | - |
| Disposal of Plant Systems | | | | | | | | | | | | | | | | | | | | | |
| 2a.1.5.1 | Automatic Press Relief | - | 118 | 7 | 12 | 134 | 70 | - | 70 | 410 | 410 | - | - | 803 | 206 | - | - | - | 45,852 | 1,656 | - |
| 2a.1.5.2 | Chemistry Sampling | - | 27 | 1 | 2 | 26 | 13 | - | 14 | 83 | 83 | - | - | 156 | 37 | - | - | - | 8,681 | 400 | - |
| 2a.1.5.3 | Chemistry Sampling - Insulated | - | 2 | 0 | 0 | - | 0 | - | 1 | 3 | 3 | - | - | - | 1 | - | - | - | 72 | 28 | - |
| 2a.1.5.4 | Circulating Water - RCA | - | 207 | 14 | 62 | 1,114 | - | - | 230 | 1,626 | 1,626 | - | - | 6,656 | - | - | - | - | 270,307 | 2,860 | - |
| 2a.1.5.5 | Combustible Gas Control - Insul - RCA | - | 29 | 0 | 2 | 36 | - | - | 13 | 80 | 80 | - | - | 212 | - | - | - | - | 8,617 | 378 | - |
| 2a.1.5.6 | Combustible Gas Control - RCA | - | 18 | 1 | 3 | 48 | - | - | 12 | 81 | 81 | - | - | 285 | - | - | - | - | 11,577 | 245 | - |
| 2a.1.5.7 | Condensate & Feedwater | - | 987 | 183 | 329 | 3,337 | 2,464 | - | 1,431 | 8,731 | 8,731 | - | - | 19,947 | 7,319 | - | - | - | 1,275,810 | 14,196 | - |
| 2a.1.5.8 | Condensate & Feedwater - Insulated | - | 492 | 34 | 63 | 699 | 408 | - | 343 | 2,038 | 2,038 | - | - | 4,176 | 1,207 | - | - | - | 246,693 | 6,964 | - |
| 2a.1.5.9 | Condensate Demin | - | 545 | 30 | 51 | 560 | 339 | - | 316 | 1,840 | 1,840 | - | - | 3,346 | 1,000 | - | - | - | 199,936 | 7,618 | - |
| 2a.1.5.10 | Condensate Storage | - | 726 | 33 | 82 | 1,193 | 270 | - | 444 | 2,748 | 2,748 | - | - | 7,131 | 795 | - | - | - | 340,568 | 10,345 | - |
| 2a.1.5.11 | Control Rod Drive | - | 3 | 0 | 0 | 3 | 1 | - | 2 | 9 | 9 | - | - | 19 | 4 | - | - | - | 1,009 | 41 | - |
| 2a.1.5.12 | Control Rod Drive Hydraulic | - | 416 | 16 | 26 | 277 | 190 | - | 199 | 1,124 | 1,124 | - | - | 1,658 | 562 | - | - | - | 103,306 | 5,898 | - |
| 2a.1.5.13 | Core Spray | - | 79 | 20 | 51 | 734 | 176 | - | 184 | 1,244 | 1,244 | - | - | 4,384 | 521 | - | - | - | 211,329 | 1,163 | - |
| 2a.1.5.14 | Core Spray - Insulated | - | 145 | 8 | 13 | 137 | 90 | - | 82 | 474 | 474 | - | - | 818 | 264 | - | - | - | 50,149 | 2,033 | - |
| 2a.1.5.15 | Demin Water - Insulated - RCA | - | 15 | 0 | 1 | 14 | - | - | 6 | 36 | 36 | - | - | 85 | - | - | - | - | 3,445 | 181 | - |
| 2a.1.5.16 | Demin Water - RCA | - | 41 | 1 | 2 | 42 | - | - | 17 | 104 | 104 | - | - | 253 | - | - | - | - | 10,278 | 508 | - |
| 2a.1.5.17 | Diesel Oil - RCA | - | 2 | 0 | 0 | 4 | - | - | 1 | 7 | 7 | - | - | 23 | - | - | - | - | 931 | 25 | - |
| 2a.1.5.18 | Drywell Atmosphere Cooling - RCA | - | 38 | 1 | 5 | 92 | - | - | 24 | 159 | 159 | - | - | 548 | - | - | - | - | 22,244 | 550 | - |
| 2a.1.5.19 | EDG Emerg Service Water - Insul - RCA | - | 0 | 0 | 0 | 0 | - | - | 0 | 1 | 1 | - | - | 2 | - | - | - | - | 84 | 4 | - |
| 2a.1.5.20 | Electrical - Clean | - | 13 | - | - | - | - | - | 2 | 15 | - | - | - | - | - | - | - | - | - | 182 | - |
| 2a.1.5.21 | Emergency Service Water - Insul - RCA | - | 21 | 0 | 1 | 23 | - | - | 9 | 55 | 55 | - | - | 137 | - | - | - | - | 5,544 | 281 | - |
| 2a.1.5.22 | Emergency Service Water - RCA | - | 2 | 0 | 0 | 2 | - | - | 1 | 5 | 5 | - | - | 13 | - | - | - | - | 512 | 22 | - |
| 2a.1.5.23 | GEZIP - RCA | - | 3 | 0 | 1 | 17 | - | - | 4 | 25 | 25 | - | - | 103 | - | - | - | - | 4,184 | 48 | - |
| 2a.1.5.24 | Generator Physical Design - RCA | - | 5 | 0 | 0 | 5 | - | - | 2 | 12 | 12 | - | - | 31 | - | - | - | - | 1,250 | 67 | - |
| 2a.1.5.25 | H2-O2 Control Analyzing | - | 6 | 0 | 0 | 1 | 5 | - | 3 | 15 | 15 | - | - | 6 | 13 | - | - | - | 1,080 | 81 | - |
| 2a.1.5.26 | H2-O2 Control Analyzing - Insulated | - | 6 | 0 | 0 | 1 | 5 | - | 3 | 15 | 15 | - | - | 6 | 13 | - | - | - | 1,080 | 81 | - |
| 2a.1.5.27 | High Pressure Coolant Injection | - | 67 | 6 | 13 | 163 | 70 | - | 61 | 381 | 381 | - | - | 972 | 209 | - | - | - | 52,792 | 966 | - |
| 2a.1.5.28 | High Pressure Coolant Injection - Insula | - | 219 | 14 | 24 | 267 | 163 | - | 141 | 830 | 830 | - | - | 1,598 | 481 | - | - | - | 95,733 | 3,079 | - |
| 2a.1.5.29 | Hydrogen Cooling | - | 8 | - | - | - | - | - | 1 | 10 | - | - | - | - | - | - | - | - | - | 118 | - |
| 2a.1.5.30 | Hydrogen Cooling - RCA | - | 7 | 0 | 0 | 7 | - | - | 3 | 17 | 17 | - | - | 39 | - | - | - | - | 1,600 | 79 | - |
| 2a.1.5.31 | Hydrogen Seal Oil - RCA | - | 17 | 0 | 2 | 32 | - | - | 9 | 60 | 60 | - | - | 189 | - | - | - | - | 7,669 | 212 | - |
| 2a.1.5.32 | Hydrogen Water Chemistry - RCA | - | 24 | 0 | 1 | 23 | - | - | 10 | 59 | 59 | - | - | 140 | - | - | - | - | 5,672 | 304 | - |
| 2a.1.5.33 | Instrument & Service Air - RCA | - | 225 | 4 | 17 | 296 | - | - | 103 | 644 | 644 | - | - | 1,768 | - | - | - | - | 71,810 | 2,733 | - |
| 2a.1.5.34 | Main Condenser | - | 196 | 12 | 20 | 223 | 139 | - | 122 | 712 | 712 | - | - | 1,333 | 411 | - | - | - | 80,439 | 2,746 | - |
| 2a.1.5.35 | Main Steam | - | 249 | 17 | 32 | 359 | 201 | - | 173 | 1,029 | 1,029 | - | - | 2,148 | 594 | - | - | - | 125,135 | 3,512 | - |
| 2a.1.5.36 | Main Turbine | - | 1,012 | 205 | 353 | 3,306 | 2,921 | - | 1,553 | 9,350 | 9,350 | - | - | 19,760 | 8,687 | - | - | - | 1,354,661 | 14,733 | - |
| 2a.1.5.37 | Main Turbine - Insulated | - | 214 | 18 | 37 | 423 | 225 | - | 180 | 1,097 | 1,097 | - | - | 2,530 | 667 | - | - | - | 145,208 | 3,069 | - |
| 2a.1.5.38 | Miscellaneous | - | 43 | 1 | 3 | 51 | - | - | 19 | 115 | 115 | - | - | 302 | - | - | - | - | 12,283 | 622 | - |
| 2a.1.5.39 | Off Gas Recombiner | - | 189 | 19 | 32 | 300 | 257 | - | 163 | 960 | 960 | - | - | 1,795 | 764 | - | - | - | 121,554 | 2,708 | - |
| 2a.1.5.40 | Off Gas Recombiner - Insulated | - | 387 | 19 | 27 | 229 | 240 | - | 197 | 1,100 | 1,100 | - | - | 1,366 | 709 | - | - | - | 100,933 | 5,385 | - |
| 2a.1.5.41 | Post Accident Sampling | - | 25 | 1 | 1 | 9 | 11 | - | 11 | 58 | 58 | - | - | 53 | 33 | - | - | - | 4,318 | 345 | - |
| 2a.1.5.42 | Post Accident Sampling - Insulated | - | 17 | 1 | 1 | 3 | 13 | - | 8 | 43 | 43 | - | - | 17 | 37 | - | - | - | 3,116 | 212 | - |
| 2a.1.5.43 | RHR Service Water - Insulated - RCA | - | 83 | 3 | 14 | 248 | - | - | 60 | 409 | 409 | - | - | 1,485 | - | - | - | - | 60,293 | 1,125 | - |
| 2a.1.5.44 | RHR Service Water - RCA | - | 4 | 0 | 0 | 6 | - | - | 2 | 12 | 12 | - | - | 35 | - | - | - | - | 1,410 | 57 | - |
| 2a.1.5.45 | Reactor Feedwater Pump Seal | - | 56 | 2 | 4 | 32 | 33 | - | 28 | 155 | 155 | - | - | 193 | 96 | - | - | - | 14,009 | 773 | - |

**Monticello Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table D
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| Disposal of Plant Systems (continued) | | | | | | | | | | | | | | | | | | | | | |
| 2a.1.5.46 | Residual Heat Removal | 362 | 252 | 172 | 178 | 1,072 | 2,051 | - | 962 | 5,049 | 5,049 | - | - | 6,406 | 6,012 | - | - | - | 647,941 | 4,135 | - |
| 2a.1.5.47 | Residual Heat Removal - Insulated | 622 | 554 | 61 | 82 | 563 | 880 | - | 772 | 3,535 | 3,535 | - | - | 3,367 | 2,607 | - | - | - | 303,087 | 10,340 | - |
| 2a.1.5.48 | Rx Core Isolation Cooling | - | 49 | 2 | 4 | 43 | 26 | - | 26 | 150 | 150 | - | - | 259 | 76 | - | - | - | 15,396 | 691 | - |
| 2a.1.5.49 | Rx Core Isolation Cooling - Insulated | - | 107 | 5 | 7 | 48 | 67 | - | 52 | 287 | 287 | - | - | 288 | 198 | - | - | - | 24,419 | 1,479 | - |
| 2a.1.5.50 | Rx Recirculation | 56 | 58 | 6 | 4 | 7 | 65 | - | 61 | 258 | 258 | - | - | 43 | 190 | - | - | - | 14,095 | 1,580 | - |
| 2a.1.5.51 | Snubbers | - | 169 | 2 | 5 | 63 | 30 | - | 60 | 331 | 331 | - | - | 377 | 90 | - | - | - | 21,009 | 2,548 | - |
| 2a.1.5.52 | Standby Liquid Control - Insul - RCA | - | 4 | 0 | 0 | 4 | - | - | 2 | 9 | 9 | - | - | 22 | - | - | - | - | 904 | 48 | - |
| 2a.1.5.53 | Standby Liquid Control - RCA | - | 26 | 1 | 2 | 41 | - | - | 13 | 83 | 83 | - | - | 245 | - | - | - | - | 9,969 | 341 | - |
| 2a.1.5.54 | Stator Cooling - RCA | - | 7 | 0 | 1 | 21 | - | - | 5 | 35 | 35 | - | - | 126 | - | - | - | - | 5,135 | 98 | - |
| 2a.1.5.55 | Traversing Incore Probe | 0 | 4 | 0 | 0 | 0 | 2 | - | 1 | 7 | 7 | - | - | 1 | 5 | - | - | - | 386 | 51 | - |
| 2a.1.5 | Totals | 1,040 | 8,221 | 924 | 1,572 | 16,339 | 11,425 | - | 8,209 | 47,730 | 47,706 | - | 24 | 97,654 | 33,808 | - | - | - | 6,125,515 | 119,943 | - |
| 2a.1.6 | Scaffolding in support of decommissioning | - | 2,265 | 22 | 12 | 191 | 31 | - | 607 | 3,127 | 3,127 | - | - | 1,030 | 91 | - | - | - | 52,111 | 22,564 | - |
| 2a.1 | Subtotal Period 2a Activity Costs | 1,742 | 29,721 | 18,645 | 6,398 | 25,937 | 50,042 | 728 | 47,148 | 180,360 | 180,336 | - | 24 | 141,010 | 59,545 | 1,761 | 898 | - | 10,458,540 | 253,640 | 2,758 |
| Period 2a Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 2a.3.1 | Process decommissioning water waste | 85 | - | 57 | 102 | - | 232 | - | 122 | 598 | 598 | - | - | - | 532 | - | - | - | 31,942 | 104 | - |
| 2a.3.2 | Process decommissioning chemical flush waste | 5 | - | 216 | 702 | - | 1,619 | - | 534 | 3,077 | 3,077 | - | - | - | 2,093 | - | - | - | 223,008 | 392 | - |
| 2a.3.3 | Small tool allowance | - | 324 | - | - | - | - | - | 49 | 373 | 336 | - | 37 | - | - | - | - | - | - | - | - |
| 2a.3.4 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 13,661 | 2,049 | 15,710 | - | 15,710 | - | - | - | - | - | - | - | - | - |
| 2a.3.5 | Retention and Severance | - | - | - | - | - | - | 13,127 | 1,969 | 15,097 | 15,097 | - | - | - | - | - | - | - | - | - | - |
| 2a.3.6 | On-site survey and release of 0.0 tons clean metallic waste | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 2a.3 | Subtotal Period 2a Collateral Costs | 91 | 324 | 274 | 804 | - | 1,851 | 26,788 | 4,723 | 34,854 | 19,107 | 15,710 | 37 | - | 2,625 | - | - | - | 254,950 | 495 | - |
| Period 2a Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 2a.4.1 | Decon supplies | 112 | - | - | - | - | - | - | 28 | 140 | 140 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.2 | Insurance | - | - | - | - | - | - | 1,019 | 102 | 1,121 | 1,121 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.3 | Property taxes | - | - | - | - | - | - | 4,377 | 438 | 4,814 | 4,814 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.4 | Health physics supplies | - | 2,356 | - | - | - | - | - | 589 | 2,945 | 2,945 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.5 | Heavy equipment rental | - | 3,627 | - | - | - | - | - | 544 | 4,171 | 4,171 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.6 | Disposal of DAW generated | - | - | 110 | 57 | - | 457 | - | 134 | 758 | 758 | - | - | - | 5,551 | - | - | - | 111,023 | 181 | - |
| 2a.4.7 | Plant energy budget | - | - | - | - | - | - | 2,501 | 375 | 2,876 | 2,876 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.8 | NRC Fees | - | - | - | - | - | - | 856 | 86 | 942 | 942 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.9 | Emergency Planning Fees | - | - | - | - | - | - | 4,115 | 412 | 4,527 | - | 4,527 | - | - | - | - | - | - | - | - | - |
| 2a.4.10 | Fixed Overhead | - | - | - | - | - | - | 3,071 | 461 | 3,532 | 3,532 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.11 | Spent Fuel Pool O&M | - | - | - | - | - | - | 1,224 | 184 | 1,408 | - | 1,408 | - | - | - | - | - | - | - | - | - |
| 2a.4.12 | ISFSI Operating Costs | - | - | - | - | - | - | 162 | 24 | 187 | - | 187 | - | - | - | - | - | - | - | - | - |
| 2a.4.13 | Railroad Track Maintenance | - | - | - | - | - | - | 181 | 27 | 208 | 208 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.14 | Remedial Actions Surveys | - | - | - | - | - | - | 1,624 | 244 | 1,867 | 1,867 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.15 | Security Staff Cost | - | - | - | - | - | - | 21,881 | 3,282 | 25,164 | 25,164 | - | - | - | - | - | - | - | - | - | 325,574 |
| 2a.4.16 | DOC Staff Cost | - | - | - | - | - | - | 21,021 | 3,153 | 24,174 | 24,174 | - | - | - | - | - | - | - | - | - | 229,108 |
| 2a.4.17 | Utility Staff Cost | - | - | - | - | - | - | 27,906 | 4,186 | 32,092 | 32,092 | - | - | - | - | - | - | - | - | - | 426,562 |
| 2a.4 | Subtotal Period 2a Period-Dependent Costs | 112 | 5,982 | 110 | 57 | - | 457 | 89,938 | 14,267 | 110,924 | 104,803 | 6,121 | - | - | 5,551 | - | - | - | 111,023 | 181 | 981,244 |
| 2a.0 | TOTAL PERIOD 2a COST | 1,945 | 36,028 | 19,028 | 7,259 | 25,937 | 52,350 | 117,455 | 66,138 | 326,139 | 304,246 | 21,831 | 62 | 141,010 | 67,722 | 1,761 | 898 | - | 10,824,520 | 254,317 | 984,002 |
| PERIOD 2b - Site Decontamination | | | | | | | | | | | | | | | | | | | | | |
| Period 2b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| Disposal of Plant Systems | | | | | | | | | | | | | | | | | | | | | |
| 2b.1.1.1 | ALARA/Radiological | - | 18 | 0 | 1 | 6 | 3 | - | 6 | 35 | 35 | - | - | 35 | 10 | - | - | - | 2,060 | 277 | - |
| 2b.1.1.2 | Alternate N2 - RCA | - | 16 | 0 | 1 | 16 | - | - | 7 | 40 | 40 | - | - | 93 | - | - | - | - | 3,765 | 185 | - |
| 2b.1.1.3 | Decontamination Projects | - | 1 | 0 | 0 | 0 | 0 | - | 0 | 2 | 2 | - | - | 2 | 0 | - | - | - | 129 | 17 | - |
| 2b.1.1.4 | Electrical - Contaminated | - | 445 | 6 | 24 | 400 | 30 | - | 183 | 1,089 | 1,089 | - | - | 2,389 | 90 | - | - | - | 102,726 | 6,325 | - |
| 2b.1.1.5 | Electrical - Decontaminated | - | 2,698 | 48 | 218 | 3,906 | - | - | 1,298 | 8,167 | 8,167 | - | - | 23,344 | - | - | - | - | 948,013 | 37,107 | - |
| 2b.1.1.6 | Fire - RCA | - | 101 | 1 | 6 | 103 | - | - | 42 | 253 | 253 | - | - | 614 | - | - | - | - | 24,917 | 1,324 | - |
| 2b.1.1.7 | HVAC Ductwork | - | 305 | 7 | 27 | 446 | 34 | - | 156 | 975 | 975 | - | - | 2,665 | 100 | - | - | - | 114,598 | 4,111 | - |
| 2b.1.1.8 | HVAC/Chilled Water - RCA | - | 324 | 6 | 26 | 461 | - | - | 155 | 971 | 971 | - | - | 2,752 | - | - | - | - | 111,779 | 3,985 | - |
| 2b.1.1.9 | Heating & Ventilation | - | 483 | 16 | 61 | 1,007 | 76 | - | 302 | 1,945 | 1,945 | - | - | 6,018 | 227 | - | - | - | 258,789 | 7,101 | - |
| 2b.1.1.10 | Heating Boiler - Insulated - RCA | - | 3 | 0 | 0 | 4 | - | - | 1 | 9 | 9 | - | - | 26 | - | - | - | - | 1,058 | 35 | - |
| 2b.1.1.11 | Liquid Radwaste | 588 | 687 | 48 | 63 | 514 | 586 | - | 703 | 3,188 | 3,188 | - | - | 3,073 | 1,728 | - | - | - | 235,484 | 17,194 | - |
| 2b.1.1.12 | Makeup Demin - RCA | - | 103 | 3 | 14 | 246 | - | - | 65 | 431 | 431 | - | - | 1,471 | - | - | - | - | 59,747 | 1,412 | - |
| 2b.1.1.13 | Non-Essential Diesel Generator - RCA | - | 27 | 3 | 13 | 238 | - | - | 45 | 327 | 327 | - | - | 1,424 | - | - | - | - | 57,832 | 395 | - |
| 2b.1.1.14 | Off Gas Holdup | - | 342 | 21 | 38 | 461 | 214 | - | 216 | 1,291 | 1,291 | - | - | 2,755 | 630 | - | - | - | 152,277 | 4,769 | - |
| 2b.1.1.15 | Primary Containment | - | 455 | 42 | 87 | 1,038 | 507 | - | 414 | 2,543 | 2,543 | - | - | 6,201 | 1,506 | - | - | - | 347,704 | 6,454 | - |

**Monticello Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table D
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---------------------------------------|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| Disposal of Plant Systems (continued) | | | | | | | | | | | | | | | | | | | | | |
| 2b.1.1.16 | Process Radiation Monitors | - | 46 | 2 | 2 | 24 | 18 | - | 20 | 111 | 111 | - | - | 142 | 52 | - | - | - | 9,115 | 649 | - |
| 2b.1.1.17 | Rx Bldg Closed Cng Water - Insul - RCA | - | 114 | 2 | 9 | 163 | - | - | 54 | 343 | 343 | - | - | 977 | - | - | - | - | 39,675 | 1,484 | - |
| 2b.1.1.18 | Rx Bldg Closed Cng Water - RCA | - | 184 | 15 | 66 | 1,187 | - | - | 235 | 1,687 | 1,687 | - | - | 7,093 | - | - | - | - | 288,031 | 2,489 | - |
| 2b.1.1.19 | Rx Component Handling Equip | 27 | 142 | 18 | 27 | 194 | 279 | - | 154 | 840 | 840 | - | - | 1,158 | 829 | - | - | - | 99,730 | 2,462 | - |
| 2b.1.1.20 | Rx Pressure Vessel | 28 | 47 | 6 | 5 | 13 | 78 | - | 48 | 225 | 225 | - | - | 75 | 230 | - | - | - | 17,816 | 1,051 | - |
| 2b.1.1.21 | Rx Water Cleanup | 172 | 265 | 19 | 16 | 22 | 251 | - | 222 | 965 | 965 | - | - | 130 | 737 | - | - | - | 52,670 | 5,736 | - |
| 2b.1.1.22 | Secondary Containment | - | 124 | 7 | 14 | 170 | 86 | - | 81 | 483 | 483 | - | - | 1,017 | 255 | - | - | - | 57,567 | 1,763 | - |
| 2b.1.1.23 | Service & Seal Water - Insulated - RCA | - | 120 | 2 | 11 | 197 | - | - | 62 | 392 | 392 | - | - | 1,180 | - | - | - | - | 47,917 | 1,565 | - |
| 2b.1.1.24 | Service & Seal Water - RCA | - | 159 | 4 | 17 | 303 | - | - | 88 | 570 | 570 | - | - | 1,809 | - | - | - | - | 73,453 | 2,016 | - |
| 2b.1.1.25 | Service Air Blower - RCA | - | 15 | 0 | 2 | 34 | - | - | 9 | 62 | 62 | - | - | 206 | - | - | - | - | 8,364 | 206 | - |
| 2b.1.1.26 | Solid Radwaste | 338 | 494 | 36 | 49 | 399 | 467 | - | 480 | 2,264 | 2,264 | - | - | 2,387 | 1,380 | - | - | - | 185,221 | 10,820 | - |
| 2b.1.1.27 | Structures & Buildings | - | 78 | 2 | 5 | 60 | 29 | - | 37 | 210 | 210 | - | - | 357 | 85 | - | - | - | 19,933 | 1,128 | - |
| 2b.1.1.28 | Wells & Domestic Water | - | 10 | - | - | - | - | - | 1 | 11 | - | - | 11 | - | - | - | - | - | - | 144 | - |
| 2b.1.1.29 | Wells & Domestic Water - RCA | - | 52 | 1 | 3 | 57 | - | - | 22 | 136 | 136 | - | - | 342 | - | - | - | - | 13,874 | 633 | - |
| 2b.1.1 | Totals | 1,153 | 7,860 | 315 | 804 | 11,668 | 2,657 | - | 5,107 | 29,563 | 29,552 | - | 11 | 69,735 | 7,859 | - | - | - | 3,334,244 | 122,835 | - |
| 2b.1.2 | Scaffolding in support of decommissioning | - | 2,831 | 28 | 16 | 239 | 38 | - | 758 | 3,909 | 3,909 | - | - | 1,287 | 114 | - | - | - | 65,139 | 28,205 | - |
| Decontamination of Site Buildings | | | | | | | | | | | | | | | | | | | | | |
| 2b.1.3.1 | Reactor Building | 5,202 | 2,903 | 178 | 516 | 8,044 | 1,181 | - | 4,924 | 22,948 | 22,948 | - | - | 48,077 | 7,014 | - | - | - | 2,317,670 | 112,518 | - |
| 2b.1.3.2 | Admin | 106 | 6 | 0 | 3 | - | 15 | - | 59 | 189 | 189 | - | - | - | 145 | - | - | - | 6,840 | 1,600 | - |
| 2b.1.3.3 | HPCI Room | 29 | 28 | 1 | 3 | 20 | 14 | - | 29 | 123 | 123 | - | - | 118 | 125 | - | - | - | 10,759 | 789 | - |
| 2b.1.3.4 | Hot Shop | 17 | 4 | 0 | 2 | - | 11 | - | 12 | 46 | 46 | - | - | - | 103 | - | - | - | 4,860 | 286 | - |
| 2b.1.3.5 | LLRW Storage & Shipping | 58 | 24 | 2 | 8 | 5 | 45 | - | 48 | 191 | 191 | - | - | 31 | 433 | - | - | - | 21,708 | 1,127 | - |
| 2b.1.3.6 | Offgas Stack | 372 | 269 | 7 | 23 | 225 | 82 | - | 312 | 1,289 | 1,289 | - | - | 1,343 | 669 | - | - | - | 87,045 | 8,860 | - |
| 2b.1.3.7 | Offgas Storage & Compressor | 41 | 17 | 1 | 6 | 4 | 33 | - | 34 | 136 | 136 | - | - | 25 | 316 | - | - | - | 15,948 | 785 | - |
| 2b.1.3.8 | Radwaste | 121 | 61 | 3 | 17 | 29 | 96 | - | 107 | 435 | 435 | - | - | 172 | 910 | - | - | - | 49,943 | 2,503 | - |
| 2b.1.3.9 | Radwaste Material Storage Warehouse | 64 | 24 | 2 | 9 | - | 52 | - | 52 | 202 | 202 | - | - | - | 495 | - | - | - | 23,400 | 1,197 | - |
| 2b.1.3.10 | Recombiner | 27 | 25 | 1 | 5 | 33 | 24 | - | 32 | 148 | 148 | - | - | 199 | 216 | - | - | - | 18,405 | 695 | - |
| 2b.1.3.11 | Turbine | 705 | 353 | 21 | 104 | 215 | 564 | - | 632 | 2,594 | 2,594 | - | - | 1,283 | 5,299 | - | - | - | 303,150 | 14,443 | - |
| 2b.1.3.12 | Turbine Building Addition | 58 | 21 | 1 | 8 | - | 45 | - | 47 | 181 | 181 | - | - | - | 434 | - | - | - | 20,478 | 1,087 | - |
| 2b.1.3 | Totals | 6,799 | 3,736 | 218 | 704 | 8,574 | 2,164 | - | 6,288 | 28,483 | 28,483 | - | - | 51,247 | 16,159 | - | - | - | 2,880,206 | 145,889 | - |
| 2b.1.4 | Prepare/submit License Termination Plan | - | - | - | - | - | - | 526 | 79 | 605 | 605 | - | - | - | - | - | - | - | - | - | 4,096 |
| 2b.1.5 | Receive NRC approval of termination plan | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 2b.1 | Subtotal Period 2b Activity Costs | 7,952 | 14,427 | 560 | 1,524 | 20,481 | 4,859 | 526 | 12,232 | 62,561 | 62,549 | - | 11 | 122,269 | 24,132 | - | - | - | 6,279,589 | 296,929 | 4,096 |
| Period 2b Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 2b.2.1 | Operational Equipment | - | - | 23 | 92 | 1,211 | - | - | 198 | 1,524 | 1,524 | - | - | 11,760 | - | - | - | - | 294,000 | 32 | - |
| 2b.2.2 | Excavation of Underground Services | - | 1,972 | - | - | - | - | 376 | 550 | 2,898 | 2,898 | - | - | - | - | - | - | - | - | 12,493 | - |
| 2b.2.3 | Security Modifications | - | - | - | - | - | - | 8,696 | 1,304 | 10,000 | 10,000 | - | - | - | - | - | - | - | - | - | - |
| 2b.2 | Subtotal Period 2b Additional Costs | - | 1,972 | 23 | 92 | 1,211 | - | 9,072 | 2,052 | 14,422 | 14,422 | - | - | 11,760 | - | - | - | - | 294,000 | 12,525 | - |
| Period 2b Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 2b.3.1 | Process decommissioning water waste | 198 | - | 135 | 240 | - | 546 | - | 285 | 1,404 | 1,404 | - | - | - | 1,253 | - | - | - | 75,186 | 244 | - |
| 2b.3.2 | Process decommissioning chemical flush waste | 1 | - | 43 | 138 | - | 319 | - | 105 | 607 | 607 | - | - | - | 413 | - | - | - | 43,978 | 77 | - |
| 2b.3.3 | Small tool allowance | - | 364 | - | - | - | - | - | 55 | 418 | 418 | - | - | - | - | - | - | - | - | - | - |
| 2b.3.4 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 117,254 | 17,588 | 134,843 | - | 134,843 | - | - | - | - | - | - | - | - | - |
| 2b.3.5 | Retention and Severance | - | - | - | - | - | - | 6,299 | 945 | 7,244 | 7,244 | - | - | - | - | - | - | - | - | - | - |
| 2b.3 | Subtotal Period 2b Collateral Costs | 199 | 364 | 178 | 378 | - | 865 | 123,554 | 18,978 | 144,516 | 9,673 | 134,843 | - | - | 1,666 | - | - | - | 119,165 | 322 | - |
| Period 2b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 2b.4.1 | Decon supplies | 1,440 | - | - | - | - | - | - | 360 | 1,799 | 1,799 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.2 | Insurance | - | - | - | - | - | - | 742 | 74 | 816 | 816 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.3 | Property taxes | - | - | - | - | - | - | 2,703 | 270 | 2,974 | 2,974 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.4 | Health physics supplies | - | 2,376 | - | - | - | - | - | 594 | 2,970 | 2,970 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.5 | Heavy equipment rental | - | 2,711 | - | - | - | - | - | 407 | 3,117 | 3,117 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.6 | Disposal of DAW generated | - | - | 101 | 52 | - | 419 | - | 123 | 694 | 694 | - | - | - | 5,084 | - | - | - | 101,679 | 166 | - |
| 2b.4.7 | Plant energy budget | - | - | - | - | - | - | 1,437 | 216 | 1,653 | 1,653 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.8 | NRC Fees | - | - | - | - | - | - | 623 | 62 | 685 | 685 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.9 | Emergency Planning Fees | - | - | - | - | - | - | 2,995 | 299 | 3,294 | - | 3,294 | - | - | - | - | - | - | - | - | - |
| 2b.4.10 | Fixed Overhead | - | - | - | - | - | - | 2,235 | 335 | 2,570 | 2,570 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.11 | Spent Fuel Pool O&M | - | - | - | - | - | - | 891 | 134 | 1,024 | - | 1,024 | - | - | - | - | - | - | - | - | - |
| 2b.4.12 | Liquid Radwaste Processing Equipment/Services | - | - | - | - | - | - | 224 | 34 | 258 | 258 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.13 | ISFSI Operating Costs | - | - | - | - | - | - | 118 | 18 | 136 | - | 136 | - | - | - | - | - | - | - | - | - |
| 2b.4.14 | Railroad Track Maintenance | - | - | - | - | - | - | 458 | 69 | 527 | 527 | - | - | - | - | - | - | - | - | - | - |

**Monticello Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table D
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|---------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| Period 2b Period-Dependent Costs (continued) | | | | | | | | | | | | | | | | | | | | | | |
| 2b.4.15 | Remedial Actions Surveys | - | - | - | - | - | - | 1,182 | 177 | 1,359 | 1,359 | - | - | - | - | - | - | - | - | - | - | |
| 2b.4.16 | Security Staff Cost | - | - | - | - | - | - | 15,925 | 2,389 | 18,314 | 18,314 | - | - | - | - | - | - | - | - | - | 236,949 | |
| 2b.4.17 | DOC Staff Cost | - | - | - | - | - | - | 14,772 | 2,216 | 16,988 | 16,988 | - | - | - | - | - | - | - | - | - | 160,160 | |
| 2b.4.18 | Utility Staff Cost | - | - | - | - | - | - | 19,442 | 2,916 | 22,358 | 22,358 | - | - | - | - | - | - | - | - | - | 297,283 | |
| 2b.4 | Subtotal Period 2b Period-Dependent Costs | 1,440 | 5,087 | 101 | 52 | - | 419 | 63,747 | 10,692 | 81,536 | 77,082 | 4,455 | - | - | 5,084 | - | - | - | - | 101,679 | 166 | 694,392 |
| 2b.0 | TOTAL PERIOD 2b COST | 9,591 | 21,850 | 861 | 2,046 | 21,692 | 6,143 | 196,899 | 43,954 | 303,035 | 163,726 | 139,297 | 11 | 134,029 | 30,882 | - | - | - | - | 6,794,433 | 309,941 | 698,488 |
| PERIOD 2d - Decontamination Following Wet Fuel Storage | | | | | | | | | | | | | | | | | | | | | | |
| Period 2d Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| 2d.1.1 | Remove spent fuel racks | 654 | 58 | 103 | 149 | - | 2,572 | - | 1,017 | 4,553 | 4,553 | - | - | - | 7,653 | - | - | - | - | 486,170 | 906 | - |
| Disposal of Plant Systems | | | | | | | | | | | | | | | | | | | | | | |
| 2d.1.2.1 | Cranes/Heavy Loads/Rigging - RCA | - | 3 | 0 | 1 | 17 | - | - | 4 | 25 | 25 | - | - | 103 | - | - | - | - | - | 4,184 | 48 | - |
| 2d.1.2.2 | Electrical - Contaminated Fuel Pool | - | 47 | 1 | 2 | 40 | 3 | - | 19 | 112 | 112 | - | - | 240 | 9 | - | - | - | - | 10,334 | 665 | - |
| 2d.1.2.3 | Electrical - Decontam. Fuel Pool Area | - | 297 | 5 | 23 | 411 | - | - | 140 | 876 | 876 | - | - | 2,457 | - | - | - | - | - | 99,783 | 4,090 | - |
| 2d.1.2.4 | Fire - RCA - Fuel Pool Area | - | 11 | 0 | 1 | 10 | - | - | 4 | 26 | 26 | - | - | 62 | - | - | - | - | - | 2,499 | 143 | - |
| 2d.1.2.5 | Fuel Pool Cooling & Cleanup | 246 | 428 | 34 | 37 | 197 | 455 | - | 382 | 1,781 | 1,781 | - | - | 1,179 | 1,341 | - | - | - | - | 133,939 | 8,380 | - |
| 2d.1.2.6 | Fuel Pool Cooling & Cleanup - Insulated | 27 | 41 | 3 | 3 | 11 | 40 | - | 36 | 161 | 161 | - | - | 67 | 117 | - | - | - | - | 10,220 | 848 | - |
| 2d.1.2.7 | HVAC Ductwork - Fuel Pool Area | - | 34 | 1 | 3 | 50 | 4 | - | 17 | 108 | 108 | - | - | 296 | 11 | - | - | - | - | 12,733 | 457 | - |
| 2d.1.2.8 | HVAC/Chilled Water - RCA Fuel Pool Area | - | 33 | 0 | 2 | 37 | - | - | 14 | 87 | 87 | - | - | 223 | - | - | - | - | - | 9,072 | 397 | - |
| 2d.1.2.9 | Instrument & Service Air-RCA-Fuel Pool | - | 29 | 1 | 2 | 45 | - | - | 14 | 91 | 91 | - | - | 267 | - | - | - | - | - | 10,841 | 357 | - |
| 2d.1.2 | Totals | 273 | 924 | 45 | 75 | 819 | 502 | - | 631 | 3,268 | 3,268 | - | - | 4,894 | 1,479 | - | - | - | - | 293,606 | 15,385 | - |
| Decontamination of Site Buildings | | | | | | | | | | | | | | | | | | | | | | |
| 2d.1.3.1 | Reactor (Post Fuel) | 946 | 2,599 | 172 | 913 | 329 | 10,216 | - | 3,880 | 19,056 | 19,056 | - | - | 1,969 | 62,698 | - | - | - | - | 2,732,406 | 45,703 | - |
| 2d.1.3 | Totals | 946 | 2,599 | 172 | 913 | 329 | 10,216 | - | 3,880 | 19,056 | 19,056 | - | - | 1,969 | 62,698 | - | - | - | - | 2,732,406 | 45,703 | - |
| 2d.1.4 | Scaffolding in support of decommissioning | - | 566 | 6 | 3 | 48 | 8 | - | 152 | 782 | 782 | - | - | 257 | 23 | - | - | - | - | 13,028 | 5,641 | - |
| 2d.1 | Subtotal Period 2d Activity Costs | 1,872 | 4,147 | 326 | 1,139 | 1,196 | 13,298 | - | 5,680 | 27,659 | 27,659 | - | - | 7,120 | 71,852 | - | - | - | - | 3,525,210 | 67,635 | - |
| Period 2d Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 2d.2.1 | License Termination Survey Planning | - | - | - | - | - | - | 1,458 | 437 | 1,896 | 1,896 | - | - | - | - | - | - | - | - | - | - | 12,480 |
| 2d.2 | Subtotal Period 2d Additional Costs | - | - | - | - | - | - | 1,458 | 437 | 1,896 | 1,896 | - | - | - | - | - | - | - | - | - | - | 12,480 |
| Period 2d Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 2d.3.1 | Process decommissioning water waste | 79 | - | 54 | 96 | - | 220 | - | 114 | 563 | 563 | - | - | - | 504 | - | - | - | - | 30,239 | 98 | - |
| 2d.3.2 | Process decommissioning chemical flush waste | 1 | - | 26 | 84 | - | 193 | - | 64 | 366 | 366 | - | - | - | 249 | - | - | - | - | 26,553 | 47 | - |
| 2d.3.3 | Small tool allowance | - | 91 | - | - | - | - | - | 14 | 105 | 105 | - | - | - | - | - | - | - | - | - | - | - |
| 2d.3.4 | Decommissioning Equipment Disposition | - | - | 130 | 82 | 1,112 | 178 | - | 237 | 1,739 | 1,739 | - | - | 6,000 | 529 | - | - | - | - | 303,608 | 147 | - |
| 2d.3.5 | Spent Fuel Capital and Transfer | - | - | - | - | - | 27 | - | 4 | 32 | - | 32 | - | - | - | - | - | - | - | - | - | - |
| 2d.3 | Subtotal Period 2d Collateral Costs | 80 | 91 | 210 | 262 | 1,112 | 590 | 27 | 432 | 2,805 | 2,773 | 32 | - | 6,000 | 1,282 | - | - | - | - | 360,400 | 292 | - |
| Period 2d Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 2d.4.1 | Decon supplies | 244 | - | - | - | - | - | - | 61 | 305 | 305 | - | - | - | - | - | - | - | - | - | - | - |
| 2d.4.2 | Insurance | - | - | - | - | - | - | 530 | 53 | 583 | 583 | - | - | - | - | - | - | - | - | - | - | - |
| 2d.4.3 | Property taxes | - | - | - | - | - | - | 1,664 | 166 | 1,830 | 1,830 | - | - | - | - | - | - | - | - | - | - | - |
| 2d.4.4 | Health physics supplies | - | 806 | - | - | - | - | - | 202 | 1,008 | 1,008 | - | - | - | - | - | - | - | - | - | - | - |
| 2d.4.5 | Heavy equipment rental | - | 1,936 | - | - | - | - | - | 290 | 2,227 | 2,227 | - | - | - | - | - | - | - | - | - | - | - |
| 2d.4.6 | Disposal of DAW generated | - | - | 40 | 21 | - | 167 | - | 49 | 277 | 277 | - | - | - | 2,030 | - | - | - | - | 40,600 | 66 | - |
| 2d.4.7 | Plant energy budget | - | - | - | - | - | - | 547 | 82 | 630 | 630 | - | - | - | - | - | - | - | - | - | - | - |
| 2d.4.8 | NRC Fees | - | - | - | - | - | - | 424 | 42 | 466 | 466 | - | - | - | - | - | - | - | - | - | - | - |
| 2d.4.9 | Emergency Planning Fees | - | - | - | - | - | - | 112 | 11 | 123 | - | 123 | - | - | - | - | - | - | - | - | - | - |
| 2d.4.10 | Fixed Overhead | - | - | - | - | - | - | 1,597 | 239 | 1,836 | 1,836 | - | - | - | - | - | - | - | - | - | - | - |
| 2d.4.11 | Liquid Radwaste Processing Equipment/Services | - | - | - | - | - | - | 320 | 48 | 368 | 368 | - | - | - | - | - | - | - | - | - | - | - |
| 2d.4.12 | ISFSI Operating Costs | - | - | - | - | - | - | 84 | 13 | 97 | - | 97 | - | - | - | - | - | - | - | - | - | - |
| 2d.4.13 | Railroad Track Maintenance | - | - | - | - | - | - | 94 | 14 | 108 | 108 | - | - | - | - | - | - | - | - | - | - | - |
| 2d.4.14 | Remedial Actions Surveys | - | - | - | - | - | - | 844 | 127 | 971 | 971 | - | - | - | - | - | - | - | - | - | - | - |
| 2d.4.15 | Security Staff Cost | - | - | - | - | - | - | 10,999 | 1,650 | 12,649 | 8,918 | 3,732 | - | - | - | - | - | - | - | - | - | 162,981 |
| 2d.4.16 | DOC Staff Cost | - | - | - | - | - | - | 7,311 | 1,097 | 8,408 | 8,408 | - | - | - | - | - | - | - | - | - | - | 78,356 |
| 2d.4.17 | Utility Staff Cost | - | - | - | - | - | - | 10,052 | 1,508 | 11,560 | 10,670 | 890 | - | - | - | - | - | - | - | - | - | 149,660 |
| 2d.4 | Subtotal Period 2d Period-Dependent Costs | 244 | 2,743 | 40 | 21 | - | 167 | 34,579 | 5,652 | 43,446 | 38,604 | 4,842 | - | 2,030 | - | - | - | - | - | 40,600 | 66 | 390,997 |
| 2d.0 | TOTAL PERIOD 2d COST | 2,196 | 6,981 | 576 | 1,422 | 2,308 | 14,055 | 36,065 | 12,202 | 75,806 | 70,932 | 4,873 | - | 13,120 | 75,164 | - | - | - | - | 3,926,210 | 67,993 | 403,477 |

**Monticello Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table D
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|---|---------------|---------------|-----------------|-----------------|---------------------------|---------------------|----------------|-------------------|----------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| PERIOD 2f - License Termination | | | | | | | | | | | | | | | | | | | | | |
| Period 2f Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| 2f.1.1 | ORISE confirmatory survey | - | - | - | - | - | - | 166 | 50 | 216 | 216 | - | - | - | - | - | - | - | - | - | - |
| 2f.1.2 | Terminate license | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 2f.1 | Subtotal Period 2f Activity Costs | - | - | - | - | - | - | 166 | 50 | 216 | 216 | - | - | - | - | - | - | - | - | - | - |
| Period 2f Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 2f.2.1 | License Termination Survey | - | - | - | - | - | - | 6,920 | 2,076 | 8,995 | 8,995 | - | - | - | - | - | - | - | - | 95,048 | 6,240 |
| 2f.2 | Subtotal Period 2f Additional Costs | - | - | - | - | - | - | 6,920 | 2,076 | 8,995 | 8,995 | - | - | - | - | - | - | - | - | 95,048 | 6,240 |
| Period 2f Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 2f.3.1 | DOC staff relocation expenses | - | - | - | - | - | - | 1,264 | 190 | 1,454 | 1,454 | - | - | - | - | - | - | - | - | - | - |
| 2f.3.2 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 47 | 7 | 54 | - | 54 | - | - | - | - | - | - | - | - | - |
| 2f.3 | Subtotal Period 2f Collateral Costs | - | - | - | - | - | - | 1,311 | 197 | 1,508 | 1,454 | 54 | - | - | - | - | - | - | - | - | - |
| Period 2f Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 2f.4.1 | Insurance | - | - | - | - | - | - | 530 | 53 | 583 | 583 | - | - | - | - | - | - | - | - | - | - |
| 2f.4.2 | Property taxes | - | - | - | - | - | - | 1,470 | 147 | 1,617 | 1,617 | - | - | - | - | - | - | - | - | - | - |
| 2f.4.3 | Health physics supplies | - | 708 | - | - | - | - | - | 177 | 884 | 884 | - | - | - | - | - | - | - | - | - | - |
| 2f.4.4 | Disposal of DAW generated | - | - | 7 | 4 | - | 29 | - | 9 | 48 | 48 | - | - | 355 | - | - | - | - | 7,097 | 12 | - |
| 2f.4.5 | Plant energy budget | - | - | - | - | - | - | 274 | 41 | 315 | 315 | - | - | - | - | - | - | - | - | - | - |
| 2f.4.6 | NRC Fees | - | - | - | - | - | - | 426 | 43 | 468 | 468 | - | - | - | - | - | - | - | - | - | - |
| 2f.4.7 | Emergency Planning Fees | - | - | - | - | - | - | 112 | 11 | 123 | - | 123 | - | - | - | - | - | - | - | - | - |
| 2f.4.8 | Fixed Overhead | - | - | - | - | - | - | 1,597 | 239 | 1,836 | 1,836 | - | - | - | - | - | - | - | - | - | - |
| 2f.4.9 | ISFSI Operating Costs | - | - | - | - | - | - | 84 | 13 | 97 | - | 97 | - | - | - | - | - | - | - | - | - |
| 2f.4.10 | Railroad Track Maintenance | - | - | - | - | - | - | 94 | 14 | 108 | 108 | - | - | - | - | - | - | - | - | - | - |
| 2f.4.11 | Security Staff Cost | - | - | - | - | - | - | 10,999 | 1,650 | 12,649 | 8,918 | 3,732 | - | - | - | - | - | - | - | - | 162,981 |
| 2f.4.12 | DOC Staff Cost | - | - | - | - | - | - | 5,393 | 809 | 6,201 | 6,201 | - | - | - | - | - | - | - | - | - | 57,200 |
| 2f.4.13 | Utility Staff Cost | - | - | - | - | - | - | 5,762 | 864 | 6,626 | 5,738 | 888 | - | - | - | - | - | - | - | - | 80,707 |
| 2f.4 | Subtotal Period 2f Period-Dependent Costs | - | 708 | 7 | 4 | - | 29 | 26,740 | 4,070 | 31,557 | 26,718 | 4,839 | - | - | 355 | - | - | - | 7,097 | 12 | 300,888 |
| 2f.0 | TOTAL PERIOD 2f COST | - | 708 | 7 | 4 | - | 29 | 35,137 | 6,392 | 42,276 | 37,382 | 4,893 | - | - | 355 | - | - | - | 7,097 | 95,059 | 307,128 |
| PERIOD 2 TOTALS | | 13,731 | 65,566 | 20,473 | 10,731 | 49,937 | 72,577 | 385,554 | 128,686 | 747,255 | 576,287 | 170,895 | 73 | 288,160 | 174,123 | 1,761 | 898 | - | 21,552,260 | 727,310 | 2,393,096 |
| PERIOD 3b - Site Restoration | | | | | | | | | | | | | | | | | | | | | |
| Period 3b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| Demolition of Remaining Site Buildings | | | | | | | | | | | | | | | | | | | | | |
| 3b.1.1.1 | Reactor Building | - | 1,971 | - | - | - | - | - | 296 | 2,267 | - | - | 2,267 | - | - | - | - | - | - | 13,911 | - |
| 3b.1.1.2 | Condensate Tanks Foundation | - | 10 | - | - | - | - | - | 1 | 11 | - | - | 11 | - | - | - | - | - | - | 50 | - |
| 3b.1.1.3 | Discharge Retention Basin | - | 4 | - | - | - | - | - | 1 | 5 | - | - | 5 | - | - | - | - | - | - | 25 | - |
| 3b.1.1.4 | HPCI Room | - | 19 | - | - | - | - | - | 3 | 22 | - | - | 22 | - | - | - | - | - | - | 97 | - |
| 3b.1.1.5 | Hot Shop | - | 16 | - | - | - | - | - | 2 | 19 | - | - | 19 | - | - | - | - | - | - | 177 | - |
| 3b.1.1.6 | Hydrogen & Oxygen Storage | - | 2 | - | - | - | - | - | 0 | 2 | - | - | 2 | - | - | - | - | - | - | 19 | - |
| 3b.1.1.7 | LLRW Storage & Shipping | - | 83 | - | - | - | - | - | 12 | 95 | - | - | 95 | - | - | - | - | - | - | 662 | - |
| 3b.1.1.8 | MSIV | - | 4 | - | - | - | - | - | 1 | 4 | - | - | 4 | - | - | - | - | - | - | 42 | - |
| 3b.1.1.9 | Misc Structures 2017 | - | 1,410 | - | - | - | - | - | 212 | 1,622 | - | - | 1,622 | - | - | - | - | - | - | 13,042 | - |
| 3b.1.1.10 | Offgas Stack | - | 108 | - | - | - | - | - | 16 | 124 | - | - | 124 | - | - | - | - | - | - | 544 | - |
| 3b.1.1.11 | Offgas Storage & Compressor | - | 39 | - | - | - | - | - | 6 | 45 | - | - | 45 | - | - | - | - | - | - | 199 | - |
| 3b.1.1.12 | Radwaste | - | 228 | - | - | - | - | - | 34 | 262 | - | - | 262 | - | - | - | - | - | - | 1,220 | - |
| 3b.1.1.13 | Recombiner | - | 128 | - | - | - | - | - | 19 | 147 | - | - | 147 | - | - | - | - | - | - | 713 | - |
| 3b.1.1.14 | Security Barrier | - | 186 | - | - | - | - | - | 28 | 214 | - | - | 214 | - | - | - | - | - | - | 933 | - |
| 3b.1.1.15 | Structures Greater than 3' Below Grade | - | 2,461 | - | - | - | - | - | 369 | 2,830 | - | - | 2,830 | - | - | - | - | - | - | 12,649 | - |
| 3b.1.1.16 | Tank Farm | - | 4 | - | - | - | - | - | 1 | 5 | - | - | 5 | - | - | - | - | - | - | 21 | - |
| 3b.1.1.17 | Turbine | - | 1,259 | - | - | - | - | - | 189 | 1,448 | - | - | 1,448 | - | - | - | - | - | - | 13,036 | - |
| 3b.1.1.18 | Turbine Building Addition | - | 55 | - | - | - | - | - | 8 | 63 | - | - | 63 | - | - | - | - | - | - | 618 | - |
| 3b.1.1.19 | Turbine Pedestal | - | 182 | - | - | - | - | - | 27 | 209 | - | - | 209 | - | - | - | - | - | - | 926 | - |
| 3b.1.1 | Totals | - | 8,169 | - | - | - | - | - | 1,225 | 9,394 | - | - | 9,394 | - | - | - | - | - | - | 58,885 | - |
| Site Closeout Activities | | | | | | | | | | | | | | | | | | | | | |
| 3b.1.2 | Grade & landscape site | - | 896 | - | - | - | - | - | 134 | 1,031 | - | - | 1,031 | - | - | - | - | - | - | 1,841 | - |
| 3b.1.3 | Final report to NRC | - | - | - | - | - | - | 200 | 30 | 231 | 231 | - | - | - | - | - | - | - | - | - | 1,560 |
| 3b.1 | Subtotal Period 3b Activity Costs | - | 9,065 | - | - | - | - | 200 | 1,390 | 10,655 | 231 | - | 10,425 | - | - | - | - | - | - | 60,726 | 1,560 |

**Monticello Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table D
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|-----------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| Period 3b Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3b.2.1 | Clean Concrete Disposal | - | 3,322 | - | - | - | - | 13 | 500 | 3,835 | - | - | 3,835 | - | - | - | - | - | - | - | 12 | - |
| 3b.2.2 | Intake Structure Cofferdam | - | 335 | - | - | - | - | - | 50 | 385 | - | - | 385 | - | - | - | - | - | - | - | 2,584 | - |
| 3b.2.3 | Construction Debris | - | - | - | - | - | - | 1,170 | 176 | 1,346 | - | - | 1,346 | - | - | - | - | - | - | - | - | - |
| 3b.2.4 | Backfill | - | 5,583 | - | - | - | - | - | 837 | 6,421 | - | - | 6,421 | - | - | - | - | - | - | - | 5,422 | - |
| 3b.2.5 | Discharge Structure Cofferdam | - | 442 | - | - | - | - | - | 66 | 508 | - | - | 508 | - | - | - | - | - | - | - | 3,552 | - |
| 3b.2 | Subtotal Period 3b Additional Costs | - | 9,682 | - | - | - | - | 1,183 | 1,630 | 12,495 | - | - | 12,495 | - | - | - | - | - | - | - | 11,570 | - |
| Period 3b Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3b.3.1 | Small tool allowance | - | 110 | - | - | - | - | - | 17 | 127 | - | - | 127 | - | - | - | - | - | - | - | - | - |
| 3b.3.2 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 108 | 16 | 125 | - | 125 | - | - | - | - | - | - | - | - | - | - |
| 3b.3 | Subtotal Period 3b Collateral Costs | - | 110 | - | - | - | - | 108 | 33 | 252 | - | 125 | 127 | - | - | - | - | - | - | - | - | - |
| Period 3b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3b.4.1 | Insurance | - | - | - | - | - | - | 1,220 | 122 | 1,342 | 1,342 | - | - | - | - | - | - | - | - | - | - | - |
| 3b.4.2 | Property taxes | - | - | - | - | - | - | 2,540 | 254 | 2,794 | - | 2,794 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.3 | Heavy equipment rental | - | 5,842 | - | - | - | - | - | 876 | 6,719 | - | - | 6,719 | - | - | - | - | - | - | - | - | - |
| 3b.4.4 | Plant energy budget | - | - | - | - | - | - | 315 | 47 | 362 | - | 362 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.5 | NRC ISFSI Fees | - | - | - | - | - | - | 356 | 36 | 391 | - | 391 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.6 | Emergency Planning Fees | - | - | - | - | - | - | 257 | 26 | 283 | - | 283 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.7 | Fixed Overhead | - | - | - | - | - | - | 1,122 | 168 | 1,290 | 429 | 860 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.8 | ISFSI Operating Costs | - | - | - | - | - | - | 194 | 29 | 223 | - | 223 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.9 | Railroad Track Maintenance | - | - | - | - | - | - | 543 | 81 | 624 | 249 | 375 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.10 | Security Staff Cost | - | - | - | - | - | - | 25,319 | 3,798 | 29,117 | 0 | 8,589 | 20,527 | - | - | - | - | - | - | - | - | 375,152 |
| 3b.4.11 | DOC Staff Cost | - | - | - | - | - | - | 11,729 | 1,759 | 13,489 | - | - | 13,489 | - | - | - | - | - | - | - | - | 122,646 |
| 3b.4.12 | Utility Staff Cost | - | - | - | - | - | - | 6,873 | 1,031 | 7,904 | - | 2,047 | 5,857 | - | - | - | - | - | - | - | - | 98,297 |
| 3b.4 | Subtotal Period 3b Period-Dependent Costs | - | 5,842 | - | - | - | - | 50,467 | 8,228 | 64,537 | 2,020 | 15,926 | 46,591 | - | - | - | - | - | - | - | - | 596,095 |
| 3b.0 | TOTAL PERIOD 3b COST | - | 24,700 | - | - | - | - | 51,959 | 11,280 | 87,939 | 2,251 | 16,050 | 69,638 | - | - | - | - | - | - | - | 72,296 | 597,655 |
| PERIOD 3c - Fuel Storage Operations/Shipping | | | | | | | | | | | | | | | | | | | | | | |
| Period 3c Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Period 3c Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3c.3.1 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 85,327 | 12,799 | 98,126 | - | 98,126 | - | - | - | - | - | - | - | - | - | - |
| 3c.3 | Subtotal Period 3c Collateral Costs | - | - | - | - | - | - | 85,327 | 12,799 | 98,126 | - | 98,126 | - | - | - | - | - | - | - | - | - | - |
| Period 3c Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3c.4.1 | Insurance | - | - | - | - | - | - | 37,329 | 3,733 | 41,062 | - | 41,062 | - | - | - | - | - | - | - | - | - | - |
| 3c.4.2 | Property taxes | - | - | - | - | - | - | 48,222 | 4,822 | 53,044 | - | 53,044 | - | - | - | - | - | - | - | - | - | - |
| 3c.4.3 | Plant energy budget | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 3c.4.4 | NRC ISFSI Fees | - | - | - | - | - | - | 12,360 | 1,236 | 13,596 | - | 13,596 | - | - | - | - | - | - | - | - | - | - |
| 3c.4.5 | Emergency Planning Fees | - | - | - | - | - | - | 7,869 | 787 | 8,656 | - | 8,656 | - | - | - | - | - | - | - | - | - | - |
| 3c.4.6 | Fixed Overhead | - | - | - | - | - | - | 11,432 | 1,715 | 13,147 | - | 13,147 | - | - | - | - | - | - | - | - | - | - |
| 3c.4.7 | ISFSI Operating Costs | - | - | - | - | - | - | 5,940 | 891 | 6,832 | - | 6,832 | - | - | - | - | - | - | - | - | - | - |
| 3c.4.8 | Railroad Track Maintenance | - | - | - | - | - | - | 6,636 | 995 | 7,632 | - | 7,632 | - | - | - | - | - | - | - | - | - | - |
| 3c.4.9 | Security Staff Cost | - | - | - | - | - | - | 228,259 | 34,239 | 262,498 | - | 262,498 | - | - | - | - | - | - | - | - | - | 2,870,241 |
| 3c.4.10 | Utility Staff Cost | - | - | - | - | - | - | 54,527 | 8,179 | 62,706 | - | 62,706 | - | - | - | - | - | - | - | - | - | 745,159 |
| 3c.4 | Subtotal Period 3c Period-Dependent Costs | - | - | - | - | - | - | 412,574 | 56,597 | 469,171 | - | 469,171 | - | - | - | - | - | - | - | - | - | 3,615,399 |
| 3c.0 | TOTAL PERIOD 3c COST | - | - | - | - | - | - | 497,902 | 69,396 | 567,298 | - | 567,298 | - | - | - | - | - | - | - | - | - | 3,615,399 |
| PERIOD 3d - GTCC shipping | | | | | | | | | | | | | | | | | | | | | | |
| Period 3d Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Nuclear Steam Supply System Removal | | | | | | | | | | | | | | | | | | | | | | |
| 3d.1.1.1 | Vessel & Internals GTCC Disposal | - | - | 1,083 | - | - | 4,313 | - | 918 | 6,314 | 6,314 | - | - | - | - | - | - | - | - | 1,160 | 225,765 | - |
| 3d.1.1 | Totals | - | - | 1,083 | - | - | 4,313 | - | 918 | 6,314 | 6,314 | - | - | - | - | - | - | - | - | 1,160 | 225,765 | - |
| 3d.1 | Subtotal Period 3d Activity Costs | - | - | 1,083 | - | - | 4,313 | - | 918 | 6,314 | 6,314 | - | - | - | - | - | - | - | - | 1,160 | 225,765 | - |
| Period 3d Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3d.3.1 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 28 | 4 | 32 | - | 32 | - | - | - | - | - | - | - | - | - | - |
| 3d.3 | Subtotal Period 3d Collateral Costs | - | - | - | - | - | - | 28 | 4 | 32 | - | 32 | - | - | - | - | - | - | - | - | - | - |

**Monticello Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table D
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|--------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| Period 3d Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3d.4.1 | Insurance | - | - | - | - | - | - | 27 | 3 | 30 | 30 | - | - | - | - | - | - | - | - | - | - | |
| 3d.4.2 | Property taxes | - | - | - | - | - | - | 35 | 3 | 38 | 38 | - | - | - | - | - | - | - | - | - | - | |
| 3d.4.4 | NRC ISFSI Fees | - | - | - | - | - | - | 8 | 1 | 9 | - | 9 | - | - | - | - | - | - | - | - | - | |
| 3d.4.5 | Emergency Planning Fees | - | - | - | - | - | - | 6 | 1 | 6 | - | 6 | - | - | - | - | - | - | - | - | - | |
| 3d.4.6 | Fixed Overhead | - | - | - | - | - | - | 8 | 1 | 10 | 10 | - | - | - | - | - | - | - | - | - | - | |
| 3d.4.7 | Railroad Track Maintenance | - | - | - | - | - | - | 5 | 1 | 6 | 6 | - | - | - | - | - | - | - | - | - | - | |
| 3d.4.8 | Security Staff Cost | - | - | - | - | - | - | 165 | 25 | 190 | 190 | - | - | - | - | - | - | - | - | - | 2,074 | |
| 3d.4.9 | Utility Staff Cost | - | - | - | - | - | - | 39 | 6 | 45 | 45 | - | - | - | - | - | - | - | - | - | 539 | |
| 3d.4 | Subtotal Period 3d Period-Dependent Costs | - | - | - | - | - | - | 293 | 40 | 333 | 318 | 15 | - | - | - | - | - | - | - | - | 2,613 | |
| 3d.0 | TOTAL PERIOD 3d COST | - | - | 1,083 | - | - | 4,313 | 321 | 962 | 6,678 | 6,632 | 47 | - | - | - | - | - | 1,160 | 225,765 | - | 2,613 | |
| PERIOD 3e - ISFSI Decontamination | | | | | | | | | | | | | | | | | | | | | | |
| Period 3e Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Period 3e Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3e.2.1 | License Termination ISFSI | - | 57 | 188 | 987 | - | 5,925 | 2,013 | 2,292 | 11,462 | 11,462 | - | - | - | 21,949 | - | - | - | - | 2,633,402 | 10,339 | 2,201 |
| 3e.2 | Subtotal Period 3e Additional Costs | - | 57 | 188 | 987 | - | 5,925 | 2,013 | 2,292 | 11,462 | 11,462 | - | - | - | 21,949 | - | - | - | - | 2,633,402 | 10,339 | 2,201 |
| Period 3e Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3e.4.1 | Insurance | - | - | - | - | - | - | 118 | 30 | 148 | 148 | - | - | - | - | - | - | - | - | - | - | |
| 3e.4.2 | Property taxes | - | - | - | - | - | - | 249 | 62 | 312 | 312 | - | - | - | - | - | - | - | - | - | - | |
| 3e.4.3 | Plant energy budget | - | - | - | - | - | - | 12 | 3 | 15 | 15 | - | - | - | - | - | - | - | - | - | - | |
| 3e.4.4 | Fixed Overhead | - | - | - | - | - | - | 71 | 18 | 89 | 89 | - | - | - | - | - | - | - | - | - | - | |
| 3e.4.5 | Railroad Track Maintenance | - | - | - | - | - | - | 41 | 10 | 52 | 52 | - | - | - | - | - | - | - | - | - | - | |
| 3e.4.6 | Security Staff Cost | - | - | - | - | - | - | 352 | 88 | 440 | 440 | - | - | - | - | - | - | - | - | - | 4,999 | |
| 3e.4.7 | Utility Staff Cost | - | - | - | - | - | - | 261 | 65 | 326 | 326 | - | - | - | - | - | - | - | - | - | 3,792 | |
| 3e.4 | Subtotal Period 3e Period-Dependent Costs | - | - | - | - | - | - | 1,105 | 276 | 1,381 | 1,381 | - | - | - | - | - | - | - | - | - | 8,792 | |
| 3e.0 | TOTAL PERIOD 3e COST | - | 57 | 188 | 987 | - | 5,925 | 3,118 | 2,569 | 12,844 | 12,844 | - | - | - | 21,949 | - | - | - | - | 2,633,402 | 10,339 | 10,993 |
| PERIOD 3f - ISFSI Site Restoration | | | | | | | | | | | | | | | | | | | | | | |
| Period 3f Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Period 3f Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3f.2.1 | Demolition and Site Restoration of ISFSI | - | 1,486 | - | - | - | - | 233 | 258 | 1,977 | - | - | 1,977 | - | - | - | - | - | - | - | 6,957 | 160 |
| 3f.2 | Subtotal Period 3f Additional Costs | - | 1,486 | - | - | - | - | 233 | 258 | 1,977 | - | - | 1,977 | - | - | - | - | - | - | - | 6,957 | 160 |
| Period 3f Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3f.3.1 | Small tool allowance | - | 10 | - | - | - | - | - | 2 | 12 | - | - | 12 | - | - | - | - | - | - | - | - | - |
| 3f.3 | Subtotal Period 3f Collateral Costs | - | 10 | - | - | - | - | - | 2 | 12 | - | - | 12 | - | - | - | - | - | - | - | - | - |
| Period 3f Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3f.4.2 | Property taxes | - | - | - | - | - | - | 126 | 13 | 138 | - | - | 138 | - | - | - | - | - | - | - | - | - |
| 3f.4.3 | Heavy equipment rental | - | 117 | - | - | - | - | - | 17 | 134 | - | - | 134 | - | - | - | - | - | - | - | - | - |
| 3f.4.4 | Plant energy budget | - | - | - | - | - | - | 6 | 1 | 7 | - | - | 7 | - | - | - | - | - | - | - | - | |
| 3f.4.5 | Fixed Overhead | - | - | - | - | - | - | 36 | 5 | 41 | - | - | 41 | - | - | - | - | - | - | - | - | |
| 3f.4.6 | Railroad Track Maintenance | - | - | - | - | - | - | 21 | 3 | 24 | - | - | 24 | - | - | - | - | - | - | - | - | |
| 3f.4.7 | Security Staff Cost | - | - | - | - | - | - | 177 | 27 | 204 | - | - | 204 | - | - | - | - | - | - | - | 2,520 | |
| 3f.4.8 | Utility Staff Cost | - | - | - | - | - | - | 109 | 16 | 126 | - | - | 126 | - | - | - | - | - | - | - | 1,564 | |
| 3f.4 | Subtotal Period 3f Period-Dependent Costs | - | 117 | - | - | - | - | 475 | 82 | 674 | - | - | 674 | - | - | - | - | - | - | - | 4,084 | |
| 3f.0 | TOTAL PERIOD 3f COST | - | 1,613 | - | - | - | - | 709 | 342 | 2,663 | - | - | 2,663 | - | - | - | - | - | - | - | 6,957 | 4,244 |
| PERIOD 3 TOTALS | | | | | | | | | | | | | | | | | | | | | | |
| TOTAL COST TO DECOMMISSION | | | | | | | | | | | | | | | | | | | | | | |
| | | 17,263 | 95,223 | 21,839 | 11,878 | 49,952 | 84,523 | 1,093,866 | 238,219 | 1,612,762 | 776,139 | 763,237 | 73,386 | 288,203 | 197,270 | 1,992 | 898 | 1,160 | 24,474,580 | 848,750 | 7,816,514 | |

**Monticello Nuclear Generating Plant
 Decommissioning Cost Analysis**

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**Table D
 Monticello Nuclear Generating Plant
 DECON Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
 (Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|----------------|----------------------|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |

| | | | | | | | | | | | | | | | | | | | | | | |
|--|--|--|--|--|--------------------|---------------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| TOTAL COST TO DECOMMISSION WITH 17.33% CONTINGENCY: | | | | | \$1,612,762 | thousands of 2020 dollars | | | | | | | | | | | | | | | | |
| TOTAL NRC LICENSE TERMINATION COST IS 48.12% OR: | | | | | \$776,139 | thousands of 2020 dollars | | | | | | | | | | | | | | | | |
| SPENT FUEL MANAGEMENT COST IS 47.32% OR: | | | | | \$763,237 | thousands of 2020 dollars | | | | | | | | | | | | | | | | |
| NON-NUCLEAR DEMOLITION COST IS 4.55% OR: | | | | | \$73,386 | thousands of 2020 dollars | | | | | | | | | | | | | | | | |
| TOTAL LOW-LEVEL RADIOACTIVE WASTE VOLUME BURIED (EXCLUDING GTCC): | | | | | 200,160 | Cubic Feet | | | | | | | | | | | | | | | | |
| TOTAL GREATER THAN CLASS C RADWASTE VOLUME GENERATED: | | | | | 1,160 | Cubic Feet | | | | | | | | | | | | | | | | |
| TOTAL SCRAP METAL REMOVED: | | | | | 23,123 | Tons | | | | | | | | | | | | | | | | |
| TOTAL CRAFT LABOR REQUIREMENTS: | | | | | 848,750 | Man-hours | | | | | | | | | | | | | | | | |

End Notes:
 n/a - indicates that this activity not charged as decommissioning expense
 a - indicates that this activity performed by decommissioning staff
 0 - indicates that this value is less than 0.5 but is non-zero
 A cell containing " - " indicates a zero value

***Monticello Nuclear Generating Plant
Decommissioning Cost Analysis***

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APPENDIX E

DETAILED COST ANALYSIS

SCENARIO 3: DECON with 100 Year DFS

**Monticello Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table E
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|--|--|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| PERIOD 1a - Shutdown through Transition | | | | | | | | | | | | | | | | | | | | | |
| Period 1a Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| 1a.1.1 | Prepare preliminary decommissioning cost | - | - | - | - | - | - | 167 | 25 | 192 | 192 | - | - | - | - | - | - | - | - | - | 1,300 |
| 1a.1.2 | Notification of Cessation of Operations | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.3 | Remove fuel & source material | - | - | - | - | - | - | - | - | n/a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.4 | Notification of Permanent Defueling | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.5 | Deactivate plant systems & process waste | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.6 | Prepare and submit PSDAR | - | - | - | - | - | - | 257 | 39 | 296 | 296 | - | - | - | - | - | - | - | - | - | 2,000 |
| 1a.1.7 | Review plant dwgs & specs. | - | - | - | - | - | - | 591 | 89 | 680 | 680 | - | - | - | - | - | - | - | - | - | 4,600 |
| 1a.1.8 | Perform detailed rad survey | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.9 | Estimate by-product inventory | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| 1a.1.10 | End product description | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| 1a.1.11 | Detailed by-product inventory | - | - | - | - | - | - | 167 | 25 | 192 | 192 | - | - | - | - | - | - | - | - | - | 1,300 |
| 1a.1.12 | Define major work sequence | - | - | - | - | - | - | 964 | 145 | 1,108 | 1,108 | - | - | - | - | - | - | - | - | - | 7,500 |
| 1a.1.13 | Perform SER and EA | - | - | - | - | - | - | 398 | 60 | 458 | 458 | - | - | - | - | - | - | - | - | - | 3,100 |
| 1a.1.14 | Prepare/submit Defueled Technical Specifications | - | - | - | - | - | - | 964 | 145 | 1,108 | 1,108 | - | - | - | - | - | - | - | - | - | 7,500 |
| 1a.1.15 | Perform Site-Specific Cost Study | - | - | - | - | - | - | 643 | 96 | 739 | 739 | - | - | - | - | - | - | - | - | - | 5,000 |
| 1a.1.16 | Prepare/submit Irradiated Fuel Management Plan | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| Activity Specifications | | | | | | | | | | | | | | | | | | | | | |
| 1a.1.17.1 | Plant & temporary facilities | - | - | - | - | - | - | 632 | 95 | 727 | 654 | - | 73 | - | - | - | - | - | - | - | 4,920 |
| 1a.1.17.2 | Plant systems | - | - | - | - | - | - | 536 | 80 | 616 | 554 | - | 62 | - | - | - | - | - | - | - | 4,167 |
| 1a.1.17.3 | NSSS Decontamination Flush | - | - | - | - | - | - | 64 | 10 | 74 | 74 | - | - | - | - | - | - | - | - | - | 500 |
| 1a.1.17.4 | Reactor internals | - | - | - | - | - | - | 912 | 137 | 1,049 | 1,049 | - | - | - | - | - | - | - | - | - | 7,100 |
| 1a.1.17.5 | Reactor vessel | - | - | - | - | - | - | 835 | 125 | 961 | 961 | - | - | - | - | - | - | - | - | - | 6,500 |
| 1a.1.17.6 | Sacrificial shield | - | - | - | - | - | - | 64 | 10 | 74 | 74 | - | - | - | - | - | - | - | - | - | 500 |
| 1a.1.17.7 | Moisture separators/reheaters | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| 1a.1.17.8 | Reinforced concrete | - | - | - | - | - | - | 206 | 31 | 236 | 118 | - | 118 | - | - | - | - | - | - | - | 1,600 |
| 1a.1.17.9 | Main Turbine | - | - | - | - | - | - | 268 | 40 | 309 | 309 | - | - | - | - | - | - | - | - | - | 2,088 |
| 1a.1.17.10 | Main Condensers | - | - | - | - | - | - | 268 | 40 | 309 | 309 | - | - | - | - | - | - | - | - | - | 2,088 |
| 1a.1.17.11 | Pressure suppression structure | - | - | - | - | - | - | 257 | 39 | 296 | 296 | - | - | - | - | - | - | - | - | - | 2,000 |
| 1a.1.17.12 | Drywell | - | - | - | - | - | - | 206 | 31 | 236 | 236 | - | - | - | - | - | - | - | - | - | 1,600 |
| 1a.1.17.13 | Plant structures & buildings | - | - | - | - | - | - | 401 | 60 | 461 | 231 | - | 231 | - | - | - | - | - | - | - | 3,120 |
| 1a.1.17.14 | Waste management | - | - | - | - | - | - | 591 | 89 | 680 | 680 | - | - | - | - | - | - | - | - | - | 4,600 |
| 1a.1.17.15 | Facility & site closeout | - | - | - | - | - | - | 116 | 17 | 133 | 67 | - | 67 | - | - | - | - | - | - | - | 900 |
| 1a.1.17 | Total | - | - | - | - | - | - | 5,486 | 823 | 6,308 | 5,759 | - | 550 | - | - | - | - | - | - | - | 42,683 |
| Planning & Site Preparations | | | | | | | | | | | | | | | | | | | | | |
| 1a.1.18 | Prepare dismantling sequence | - | - | - | - | - | - | 308 | 46 | 355 | 355 | - | - | - | - | - | - | - | - | - | 2,400 |
| 1a.1.19 | Plant prep. & temp. svces | - | - | - | - | - | - | 3,500 | 525 | 4,025 | 4,025 | - | - | - | - | - | - | - | - | - | - |
| 1a.1.20 | Design water clean-up system | - | - | - | - | - | - | 180 | 27 | 207 | 207 | - | - | - | - | - | - | - | - | - | 1,400 |
| 1a.1.21 | Rigging/Cont. Cntrl Envlps/tooling/etc. | - | - | - | - | - | - | 2,400 | 360 | 2,760 | 2,760 | - | - | - | - | - | - | - | - | - | - |
| 1a.1.22 | Procure casks/liners & containers | - | - | - | - | - | - | 158 | 24 | 182 | 182 | - | - | - | - | - | - | - | - | - | 1,230 |
| 1a.1 | Subtotal Period 1a Activity Costs | - | - | - | - | - | - | 16,569 | 2,485 | 19,054 | 18,505 | - | 550 | - | - | - | - | - | - | - | 83,013 |
| Period 1a Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 1a.3.1 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 1,323 | 198 | 1,522 | - | 1,522 | - | - | - | - | - | - | - | - | - |
| 1a.3.2 | Retention and Severance | - | - | - | - | - | - | 9,892 | 1,484 | 11,376 | 11,376 | - | - | - | - | - | - | - | - | - | - |
| 1a.3 | Subtotal Period 1a Collateral Costs | - | - | - | - | - | - | 11,215 | 1,682 | 12,897 | 11,376 | 1,522 | - | - | - | - | - | - | - | - | - |
| Period 1a Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 1a.4.1 | Insurance | - | - | - | - | - | - | 2,328 | 233 | 2,561 | 2,561 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.2 | Property taxes | - | - | - | - | - | - | 3,570 | 357 | 3,927 | 3,927 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.3 | Health physics supplies | - | 614 | - | - | - | - | - | 153 | 767 | 767 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.4 | Heavy equipment rental | - | 753 | - | - | - | - | - | 113 | 866 | 866 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.5 | Disposal of DAW generated | - | - | 12 | 6 | - | 50 | - | 15 | 83 | 83 | - | - | 610 | - | - | - | - | 12,190 | 20 | - |
| 1a.4.6 | Plant energy budget | - | - | - | - | - | - | 1,817 | 272 | 2,089 | 2,089 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.7 | NRC Fees | - | - | - | - | - | - | 1,137 | 114 | 1,251 | 1,251 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.8 | Emergency Planning Fees | - | - | - | - | - | - | 3,428 | 343 | 3,770 | - | 3,770 | - | - | - | - | - | - | - | - | - |
| 1a.4.9 | Fixed Overhead | - | - | - | - | - | - | 2,616 | 392 | 3,009 | 3,009 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.10 | Spent Fuel Pool O&M | - | - | - | - | - | - | 845 | 127 | 971 | - | 971 | - | - | - | - | - | - | - | - | - |
| 1a.4.11 | ISFSI Operating Costs | - | - | - | - | - | - | 112 | 17 | 129 | - | 129 | - | - | - | - | - | - | - | - | - |
| 1a.4.12 | Railroad Track Maintenance | - | - | - | - | - | - | 125 | 19 | 144 | 144 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.13 | Security Staff Cost | - | - | - | - | - | - | 16,372 | 2,456 | 18,827 | 18,827 | - | - | - | - | - | - | - | - | - | 245,440 |
| 1a.4.14 | Utility Staff Cost | - | - | - | - | - | - | 27,285 | 4,093 | 31,378 | 31,378 | - | - | - | - | - | - | - | - | - | 422,240 |
| 1a.4 | Subtotal Period 1a Period-Dependent Costs | - | 1,367 | 12 | 6 | - | 50 | 59,634 | 8,703 | 69,772 | 64,902 | 4,870 | - | 610 | - | - | - | - | 12,190 | 20 | 667,680 |

**Monticello Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table E
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|--|--------------|--------------|-----------------|-----------------|---------------------------|---------------------|----------------|-------------------|----------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| 1a.0 | TOTAL PERIOD 1a COST | - | 1,367 | 12 | 6 | - | 50 | 87,418 | 12,871 | 101,724 | 94,783 | 6,392 | 550 | - | 610 | - | - | - | 12,190 | 20 | 750,693 |
| PERIOD 1b - Decommissioning Preparations | | | | | | | | | | | | | | | | | | | | | |
| Period 1b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| Detailed Work Procedures | | | | | | | | | | | | | | | | | | | | | |
| 1b.1.1.1 | Plant systems | - | - | - | - | - | - | 608 | 91 | 700 | 630 | - | 70 | - | - | - | - | - | - | - | 4,733 |
| 1b.1.1.2 | NSSS Decontamination Flush | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| 1b.1.1.3 | Reactor internals | - | - | - | - | - | - | 514 | 77 | 591 | 591 | - | - | - | - | - | - | - | - | - | 4,000 |
| 1b.1.1.4 | Remaining buildings | - | - | - | - | - | - | 174 | 26 | 200 | 50 | - | 150 | - | - | - | - | - | - | - | 1,350 |
| 1b.1.1.5 | CRD housings & NIs | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| 1b.1.1.6 | Incore instrumentation | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| 1b.1.1.7 | Removal primary containment | - | - | - | - | - | - | 257 | 39 | 296 | 296 | - | - | - | - | - | - | - | - | - | 2,000 |
| 1b.1.1.8 | Reactor vessel | - | - | - | - | - | - | 467 | 70 | 537 | 537 | - | - | - | - | - | - | - | - | - | 3,630 |
| 1b.1.1.9 | Facility closeout | - | - | - | - | - | - | 154 | 23 | 177 | 89 | - | 89 | - | - | - | - | - | - | - | 1,200 |
| 1b.1.1.10 | Sacrificial shield | - | - | - | - | - | - | 154 | 23 | 177 | 177 | - | - | - | - | - | - | - | - | - | 1,200 |
| 1b.1.1.11 | Reinforced concrete | - | - | - | - | - | - | 129 | 19 | 148 | 74 | - | 74 | - | - | - | - | - | - | - | 1,000 |
| 1b.1.1.12 | Main Turbine | - | - | - | - | - | - | 267 | 40 | 307 | 307 | - | - | - | - | - | - | - | - | - | 2,080 |
| 1b.1.1.13 | Main Condensers | - | - | - | - | - | - | 268 | 40 | 309 | 309 | - | - | - | - | - | - | - | - | - | 2,088 |
| 1b.1.1.14 | Moisture separators & reheaters | - | - | - | - | - | - | 257 | 39 | 296 | 296 | - | - | - | - | - | - | - | - | - | 2,000 |
| 1b.1.1.15 | Radwaste building | - | - | - | - | - | - | 351 | 53 | 403 | 363 | - | 40 | - | - | - | - | - | - | - | 2,730 |
| 1b.1.1.16 | Reactor building | - | - | - | - | - | - | 351 | 53 | 403 | 363 | - | 40 | - | - | - | - | - | - | - | 2,730 |
| 1b.1.1 | Total | - | - | - | - | - | - | 4,336 | 650 | 4,987 | 4,524 | - | 463 | - | - | - | - | - | - | - | 33,741 |
| 1b.1.2 | Decon NSSS | 296 | - | - | - | - | - | - | 148 | 444 | 444 | - | - | - | - | - | - | - | - | 1,067 | - |
| 1b.1 | Subtotal Period 1b Activity Costs | 296 | - | - | - | - | - | 4,336 | 798 | 5,431 | 4,968 | - | 463 | - | - | - | - | - | - | 1,067 | 33,741 |
| Period 1b Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 1b.2.1 | Spent Fuel Pool Isolation | - | - | - | - | - | - | 12,675 | 1,901 | 14,576 | 14,576 | - | - | - | - | - | - | - | - | - | - |
| 1b.2.2 | Site Characterization | - | - | - | - | - | - | 5,930 | 1,779 | 7,708 | 7,708 | - | - | - | - | - | - | - | - | - | 30,500 |
| 1b.2.3 | Mixed & RCRA Waste | - | - | 28 | 29 | 14 | - | - | 9 | 80 | 80 | - | - | 43 | - | - | - | - | 5,253 | 161 | - |
| 1b.2 | Subtotal Period 1b Additional Costs | - | - | 28 | 29 | 14 | - | 18,605 | 3,689 | 22,365 | 22,365 | - | - | 43 | - | - | - | - | 5,253 | 30,661 | 10,852 |
| Period 1b Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 1b.3.1 | Decon equipment | 1,055 | - | - | - | - | - | - | 158 | 1,213 | 1,213 | - | - | - | - | - | - | - | - | - | - |
| 1b.3.2 | DOC staff relocation expenses | - | - | - | - | - | - | 1,264 | 190 | 1,454 | 1,454 | - | - | - | - | - | - | - | - | - | - |
| 1b.3.3 | Process decommissioning water waste | 38 | - | 25 | 45 | - | 102 | - | 53 | 263 | 263 | - | - | - | 233 | - | - | - | - | 13,991 | 45 |
| 1b.3.4 | Process decommissioning chemical flush waste | 1 | - | 24 | 77 | - | 1,526 | - | 396 | 2,024 | 2,024 | - | - | - | - | 231 | - | - | - | 24,599 | 43 |
| 1b.3.5 | Small tool allowance | - | 2 | - | - | - | - | - | 0 | 2 | 2 | - | - | - | - | - | - | - | - | - | - |
| 1b.3.6 | Pipe cutting equipment | - | 1,200 | - | - | - | - | - | 180 | 1,380 | 1,380 | - | - | - | - | - | - | - | - | - | - |
| 1b.3.7 | Decon rig | 2,104 | - | - | - | - | - | - | 316 | 2,419 | 2,419 | - | - | - | - | - | - | - | - | - | - |
| 1b.3.8 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 2,735 | 410 | 3,145 | - | 3,145 | - | - | - | - | - | - | - | - | - |
| 1b.3.9 | Retention and Severance | - | - | - | - | - | - | 6,335 | 950 | 7,285 | 7,285 | - | - | - | - | - | - | - | - | - | - |
| 1b.3 | Subtotal Period 1b Collateral Costs | 3,197 | 1,202 | 49 | 122 | - | 1,628 | 10,334 | 2,653 | 19,185 | 16,040 | 3,145 | - | - | 233 | 231 | - | - | 38,589 | 89 | - |
| Period 1b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 1b.4.1 | Decon supplies | 39 | - | - | - | - | - | - | 10 | 48 | 48 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.2 | Insurance | - | - | - | - | - | - | 1,161 | 116 | 1,277 | 1,277 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.3 | Property taxes | - | - | - | - | - | - | 1,709 | 171 | 1,880 | 1,880 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.4 | Health physics supplies | - | 344 | - | - | - | - | - | 86 | 430 | 430 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.5 | Heavy equipment rental | - | 375 | - | - | - | - | - | 56 | 432 | 432 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.6 | Disposal of DAW generated | - | - | 7 | 4 | - | 29 | - | 9 | 49 | 49 | - | - | - | 356 | - | - | - | 7,122 | 12 | - |
| 1b.4.7 | Plant energy budget | - | - | - | - | - | - | 1,812 | 272 | 2,083 | 2,083 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.8 | NRC Fees | - | - | - | - | - | - | 323 | 32 | 355 | 355 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.9 | Emergency Planning Fees | - | - | - | - | - | - | 1,416 | 142 | 1,557 | - | 1,557 | - | - | - | - | - | - | - | - | - |
| 1b.4.10 | Fixed Overhead | - | - | - | - | - | - | 1,305 | 196 | 1,500 | 1,500 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.11 | Spent Fuel Pool O&M | - | - | - | - | - | - | 421 | 63 | 484 | - | 484 | - | - | - | - | - | - | - | - | - |
| 1b.4.12 | ISFSI Operating Costs | - | - | - | - | - | - | 56 | 8 | 64 | - | 64 | - | - | - | - | - | - | - | - | - |
| 1b.4.13 | Railroad Track Maintenance | - | - | - | - | - | - | 62 | 9 | 72 | 72 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.14 | Security Staff Cost | - | - | - | - | - | - | 8,163 | 1,225 | 9,388 | 9,388 | - | - | - | - | - | - | - | - | - | 122,384 |
| 1b.4.15 | DOC Staff Cost | - | - | - | - | - | - | 5,846 | 877 | 6,723 | 6,723 | - | - | - | - | - | - | - | - | - | 63,266 |
| 1b.4.16 | Utility Staff Cost | - | - | - | - | - | - | 13,682 | 2,052 | 15,734 | 15,734 | - | - | - | - | - | - | - | - | - | 211,579 |
| 1b.4 | Subtotal Period 1b Period-Dependent Costs | 39 | 719 | 7 | 4 | - | 29 | 35,955 | 5,323 | 42,076 | 39,970 | 2,106 | - | - | 356 | - | - | - | 7,122 | 12 | 397,229 |
| 1b.0 | TOTAL PERIOD 1b COST | 3,531 | 1,921 | 84 | 154 | 14 | 1,657 | 69,230 | 12,465 | 89,056 | 83,343 | 5,251 | 463 | 43 | 589 | 231 | - | - | 50,964 | 31,828 | 441,822 |
| PERIOD 1 TOTALS | | 3,531 | 3,288 | 96 | 160 | 14 | 1,707 | 156,648 | 25,335 | 190,780 | 178,125 | 11,643 | 1,012 | 43 | 1,199 | 231 | - | - | 63,155 | 31,848 | 1,192,515 |

**Monticello Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table E
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|--|--|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| PERIOD 2a - Large Component Removal | | | | | | | | | | | | | | | | | | | | | |
| Period 2a Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| Nuclear Steam Supply System Removal | | | | | | | | | | | | | | | | | | | | | |
| 2a.1.1.1 | Recirculation System Piping & Valves | 111 | 94 | 27 | 50 | - | 528 | - | 221 | 1,031 | 1,031 | - | - | - | 1,430 | - | - | - | 99,742 | 2,905 | - |
| 2a.1.1.2 | Recirculation Pumps & Motors | 40 | 63 | 16 | 51 | 42 | 539 | - | 186 | 938 | 938 | - | - | 96 | 945 | - | - | - | 112,200 | 1,563 | - |
| 2a.1.1.3 | CRDMs & NIs Removal | 194 | 1,020 | 415 | 135 | - | 1,130 | - | 696 | 3,591 | 3,591 | - | - | - | 3,741 | - | - | - | 213,700 | 17,768 | - |
| 2a.1.1.4 | Reactor Vessel Internals | 244 | 6,722 | 12,852 | 2,696 | - | 29,845 | 364 | 24,027 | 76,749 | 76,749 | - | - | - | 1,252 | 1,761 | 898 | - | 343,150 | 30,515 | 1,379 |
| 2a.1.1.5 | Reactor Vessel | 113 | 9,121 | 2,672 | 1,167 | - | 5,861 | 364 | 10,842 | 30,140 | 30,140 | - | - | - | 16,169 | - | - | - | 1,105,210 | 30,515 | 1,379 |
| 2a.1.1 | Totals | 702 | 17,020 | 15,982 | 4,099 | 42 | 37,903 | 728 | 35,973 | 112,449 | 112,449 | - | - | 96 | 23,536 | 1,761 | 898 | - | 1,874,002 | 83,267 | 2,758 |
| Removal of Major Equipment | | | | | | | | | | | | | | | | | | | | | |
| 2a.1.2 | Main Turbine/Generator | - | 385 | 1,356 | 521 | 6,139 | 439 | - | 1,341 | 10,182 | 10,182 | - | - | 24,835 | 1,383 | - | - | - | 1,577,959 | 5,438 | - |
| 2a.1.3 | Main Condensers | - | 1,347 | 360 | 194 | 3,225 | 244 | - | 947 | 6,317 | 6,317 | - | - | 17,396 | 727 | - | - | - | 828,955 | 18,831 | - |
| Cascading Costs from Clean Building Demolition | | | | | | | | | | | | | | | | | | | | | |
| 2a.1.4.1 | Reactor Building | - | 332 | - | - | - | - | - | 50 | 381 | 381 | - | - | - | - | - | - | - | - | 2,217 | - |
| 2a.1.4.2 | Radwaste | - | 25 | - | - | - | - | - | 4 | 28 | 28 | - | - | - | - | - | - | - | - | 127 | - |
| 2a.1.4.3 | Turbine | - | 127 | - | - | - | - | - | 19 | 146 | 146 | - | - | - | - | - | - | - | - | 1,254 | - |
| 2a.1.4 | Totals | - | 483 | - | - | - | - | - | 72 | 556 | 556 | - | - | - | - | - | - | - | - | 3,598 | - |
| Disposal of Plant Systems | | | | | | | | | | | | | | | | | | | | | |
| 2a.1.5.1 | Automatic Press Relief | - | 118 | 7 | 12 | 134 | 70 | - | 70 | 410 | 410 | - | - | 803 | 206 | - | - | - | 45,852 | 1,656 | - |
| 2a.1.5.2 | Chemistry Sampling | - | 27 | 1 | 2 | 26 | 13 | - | 14 | 83 | 83 | - | - | 156 | 37 | - | - | - | 8,681 | 400 | - |
| 2a.1.5.3 | Chemistry Sampling - Insulated | - | 2 | 0 | 0 | - | 0 | - | 1 | 3 | 3 | - | - | - | 1 | - | - | - | 72 | 28 | - |
| 2a.1.5.4 | Circulating Water - RCA | - | 207 | 14 | 62 | 1,114 | - | - | 230 | 1,626 | 1,626 | - | - | 6,656 | - | - | - | - | 270,307 | 2,860 | - |
| 2a.1.5.5 | Combustible Gas Control - Insul - RCA | - | 29 | 0 | 2 | 36 | - | - | 13 | 80 | 80 | - | - | 212 | - | - | - | - | 8,617 | 378 | - |
| 2a.1.5.6 | Combustible Gas Control - RCA | - | 18 | 1 | 3 | 48 | - | - | 12 | 81 | 81 | - | - | 285 | - | - | - | - | 11,577 | 245 | - |
| 2a.1.5.7 | Condensate & Feedwater | - | 987 | 183 | 329 | 3,337 | 2,464 | - | 1,431 | 8,731 | 8,731 | - | - | 19,947 | 7,319 | - | - | - | 1,275,810 | 14,196 | - |
| 2a.1.5.8 | Condensate & Feedwater - Insulated | - | 492 | 34 | 63 | 699 | 408 | - | 343 | 2,038 | 2,038 | - | - | 4,176 | 1,207 | - | - | - | 246,693 | 6,964 | - |
| 2a.1.5.9 | Condensate Demin | - | 545 | 30 | 51 | 560 | 339 | - | 316 | 1,840 | 1,840 | - | - | 3,346 | 1,000 | - | - | - | 199,936 | 7,618 | - |
| 2a.1.5.10 | Condensate Storage | - | 726 | 33 | 82 | 1,193 | 270 | - | 444 | 2,748 | 2,748 | - | - | 7,131 | 795 | - | - | - | 340,568 | 10,345 | - |
| 2a.1.5.11 | Control Rod Drive | - | 3 | 0 | 0 | 3 | 1 | - | 2 | 9 | 9 | - | - | 19 | 4 | - | - | - | 1,009 | 41 | - |
| 2a.1.5.12 | Control Rod Drive Hydraulic | - | 416 | 16 | 26 | 277 | 190 | - | 199 | 1,124 | 1,124 | - | - | 1,658 | 562 | - | - | - | 103,306 | 5,898 | - |
| 2a.1.5.13 | Core Spray | - | 79 | 20 | 51 | 734 | 176 | - | 184 | 1,244 | 1,244 | - | - | 4,384 | 521 | - | - | - | 211,329 | 1,163 | - |
| 2a.1.5.14 | Core Spray - Insulated | - | 145 | 8 | 13 | 137 | 90 | - | 82 | 474 | 474 | - | - | 818 | 264 | - | - | - | 50,149 | 2,033 | - |
| 2a.1.5.15 | Demin Water - Insulated - RCA | - | 15 | 0 | 1 | 14 | - | - | 6 | 36 | 36 | - | - | 85 | - | - | - | - | 3,445 | 181 | - |
| 2a.1.5.16 | Demin Water - RCA | - | 41 | 1 | 2 | 42 | - | - | 17 | 104 | 104 | - | - | 253 | - | - | - | - | 10,278 | 508 | - |
| 2a.1.5.17 | Diesel Oil - RCA | - | 2 | 0 | 0 | 4 | - | - | 1 | 7 | 7 | - | - | 23 | - | - | - | - | 931 | 25 | - |
| 2a.1.5.18 | Drywell Atmosphere Cooling - RCA | - | 38 | 1 | 5 | 92 | - | - | 24 | 159 | 159 | - | - | 548 | - | - | - | - | 22,244 | 550 | - |
| 2a.1.5.19 | EDG Emerg Service Water - Insul - RCA | - | 0 | 0 | 0 | 0 | - | - | 0 | 1 | 1 | - | - | 2 | - | - | - | - | 84 | 4 | - |
| 2a.1.5.20 | Electrical - Clean | - | 13 | - | - | - | - | - | 2 | 15 | - | - | 15 | - | - | - | - | - | - | 182 | - |
| 2a.1.5.21 | Emergency Service Water - Insul - RCA | - | 21 | 0 | 1 | 23 | - | - | 9 | 55 | 55 | - | - | 137 | - | - | - | - | 5,544 | 281 | - |
| 2a.1.5.22 | Emergency Service Water - RCA | - | 2 | 0 | 0 | 2 | - | - | 1 | 5 | 5 | - | - | 13 | - | - | - | - | 512 | 22 | - |
| 2a.1.5.23 | GEZIP - RCA | - | 3 | 0 | 1 | 17 | - | - | 4 | 25 | 25 | - | - | 103 | - | - | - | - | 4,184 | 48 | - |
| 2a.1.5.24 | Generator Physical Design - RCA | - | 5 | 0 | 0 | 5 | - | - | 2 | 12 | 12 | - | - | 31 | - | - | - | - | 1,250 | 67 | - |
| 2a.1.5.25 | H2-O2 Control Analyzing | - | 6 | 0 | 0 | 1 | 5 | - | 3 | 15 | 15 | - | - | 6 | 13 | - | - | - | 1,080 | 81 | - |
| 2a.1.5.26 | H2-O2 Control Analyzing - Insulated | - | 6 | 0 | 0 | 1 | 5 | - | 3 | 15 | 15 | - | - | 6 | 13 | - | - | - | 1,080 | 81 | - |
| 2a.1.5.27 | High Pressure Coolant Injection | - | 67 | 6 | 13 | 163 | 70 | - | 61 | 381 | 381 | - | - | 972 | 209 | - | - | - | 52,792 | 966 | - |
| 2a.1.5.28 | High Pressure Coolant Injection - Insula | - | 219 | 14 | 24 | 267 | 163 | - | 141 | 830 | 830 | - | - | 1,598 | 481 | - | - | - | 95,733 | 3,079 | - |
| 2a.1.5.29 | Hydrogen Cooling | - | 8 | - | - | - | - | - | 1 | 10 | - | - | 10 | - | - | - | - | - | - | 118 | - |
| 2a.1.5.30 | Hydrogen Cooling - RCA | - | 7 | 0 | 0 | 7 | - | - | 3 | 17 | 17 | - | - | 39 | - | - | - | - | 1,600 | 79 | - |
| 2a.1.5.31 | Hydrogen Seal Oil - RCA | - | 17 | 0 | 2 | 32 | - | - | 9 | 60 | 60 | - | - | 189 | - | - | - | - | 7,669 | 212 | - |
| 2a.1.5.32 | Hydrogen Water Chemistry - RCA | - | 24 | 0 | 1 | 23 | - | - | 10 | 59 | 59 | - | - | 140 | - | - | - | - | 5,672 | 304 | - |
| 2a.1.5.33 | Instrument & Service Air - RCA | - | 225 | 4 | 17 | 296 | - | - | 103 | 644 | 644 | - | - | 1,768 | - | - | - | - | 71,810 | 2,733 | - |
| 2a.1.5.34 | Main Condenser | - | 196 | 12 | 20 | 223 | 139 | - | 122 | 712 | 712 | - | - | 1,333 | 411 | - | - | - | 80,439 | 2,746 | - |
| 2a.1.5.35 | Main Steam | - | 249 | 17 | 32 | 359 | 201 | - | 173 | 1,029 | 1,029 | - | - | 2,148 | 594 | - | - | - | 125,135 | 3,512 | - |
| 2a.1.5.36 | Main Turbine | - | 1,012 | 205 | 353 | 3,306 | 2,921 | - | 1,553 | 9,350 | 9,350 | - | - | 19,760 | 8,687 | - | - | - | 1,354,661 | 14,733 | - |
| 2a.1.5.37 | Main Turbine - Insulated | - | 214 | 18 | 37 | 423 | 225 | - | 180 | 1,097 | 1,097 | - | - | 2,530 | 667 | - | - | - | 145,208 | 3,069 | - |
| 2a.1.5.38 | Miscellaneous | - | 43 | 1 | 3 | 51 | - | - | 19 | 115 | 115 | - | - | 302 | - | - | - | - | 12,283 | 622 | - |
| 2a.1.5.39 | Off Gas Recombiner | - | 189 | 19 | 32 | 300 | 257 | - | 163 | 960 | 960 | - | - | 1,795 | 764 | - | - | - | 121,554 | 2,708 | - |
| 2a.1.5.40 | Off Gas Recombiner - Insulated | - | 387 | 19 | 27 | 229 | 240 | - | 197 | 1,100 | 1,100 | - | - | 1,366 | 709 | - | - | - | 100,933 | 5,385 | - |
| 2a.1.5.41 | Post Accident Sampling | - | 25 | 1 | 1 | 9 | 11 | - | 11 | 58 | 58 | - | - | 53 | 33 | - | - | - | 4,318 | 345 | - |
| 2a.1.5.42 | Post Accident Sampling - Insulated | - | 17 | 1 | 1 | 3 | 13 | - | 8 | 43 | 43 | - | - | 17 | 37 | - | - | - | 3,116 | 212 | - |
| 2a.1.5.43 | RHR Service Water - Insulated - RCA | - | 83 | 3 | 14 | 248 | - | - | 60 | 409 | 409 | - | - | 1,485 | - | - | - | - | 60,293 | 1,125 | - |
| 2a.1.5.44 | RHR Service Water - RCA | - | 4 | 0 | 0 | 6 | - | - | 2 | 12 | 12 | - | - | 35 | - | - | - | - | 1,410 | 57 | - |
| 2a.1.5.45 | Reactor Feedwater Pump Seal | - | 56 | 2 | 4 | 32 | 33 | - | 28 | 155 | 155 | - | - | 193 | 96 | - | - | - | 14,009 | 773 | - |

**Monticello Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table E
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|--|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| Disposal of Plant Systems (continued) | | | | | | | | | | | | | | | | | | | | | |
| 2a.1.5.46 | Residual Heat Removal | 362 | 252 | 172 | 178 | 1,072 | 2,051 | - | 962 | 5,049 | 5,049 | - | - | 6,406 | 6,012 | - | - | - | 647,941 | 4,135 | - |
| 2a.1.5.47 | Residual Heat Removal - Insulated | 622 | 554 | 61 | 82 | 563 | 880 | - | 772 | 3,535 | 3,535 | - | - | 3,367 | 2,607 | - | - | - | 303,087 | 10,340 | - |
| 2a.1.5.48 | Rx Core Isolation Cooling | - | 49 | 2 | 4 | 43 | 26 | - | 26 | 150 | 150 | - | - | 259 | 76 | - | - | - | 15,396 | 691 | - |
| 2a.1.5.49 | Rx Core Isolation Cooling - Insulated | - | 107 | 5 | 7 | 48 | 67 | - | 52 | 287 | 287 | - | - | 288 | 198 | - | - | - | 24,419 | 1,479 | - |
| 2a.1.5.50 | Rx Recirculation | 56 | 58 | 6 | 4 | 7 | 65 | - | 61 | 258 | 258 | - | - | 43 | 190 | - | - | - | 14,095 | 1,580 | - |
| 2a.1.5.51 | Snubbers | - | 169 | 2 | 5 | 63 | 30 | - | 60 | 331 | 331 | - | - | 377 | 90 | - | - | - | 21,009 | 2,548 | - |
| 2a.1.5.52 | Standby Liquid Control - Insul - RCA | - | 4 | 0 | 0 | 4 | - | - | 2 | 9 | 9 | - | - | 22 | - | - | - | - | 904 | 48 | - |
| 2a.1.5.53 | Standby Liquid Control - RCA | - | 26 | 1 | 2 | 41 | - | - | 13 | 83 | 83 | - | - | 245 | - | - | - | - | 9,969 | 341 | - |
| 2a.1.5.54 | Stator Cooling - RCA | - | 7 | 0 | 1 | 21 | - | - | 5 | 35 | 35 | - | - | 126 | - | - | - | - | 5,135 | 98 | - |
| 2a.1.5.55 | Traversing Incore Probe | 0 | 4 | 0 | 0 | 0 | 2 | - | 1 | 7 | 7 | - | - | 1 | 5 | - | - | - | 386 | 51 | - |
| 2a.1.5 | Totals | 1,040 | 8,221 | 924 | 1,572 | 16,339 | 11,425 | - | 8,209 | 47,730 | 47,706 | - | 24 | 97,654 | 33,808 | - | - | - | 6,125,515 | 119,943 | - |
| 2a.1.6 | Scaffolding in support of decommissioning | - | 2,265 | 22 | 12 | 191 | 31 | - | 607 | 3,127 | 3,127 | - | - | 1,030 | 91 | - | - | - | 52,111 | 22,564 | - |
| 2a.1 | Subtotal Period 2a Activity Costs | 1,742 | 29,721 | 18,645 | 6,398 | 25,937 | 50,042 | 728 | 47,148 | 180,360 | 180,336 | - | 24 | 141,010 | 59,545 | 1,761 | 898 | - | 10,458,540 | 253,640 | 2,758 |
| Period 2a Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 2a.3.1 | Process decommissioning water waste | 85 | - | 57 | 102 | - | 232 | - | 122 | 598 | 598 | - | - | - | 532 | - | - | - | 31,942 | 104 | - |
| 2a.3.2 | Process decommissioning chemical flush waste | 5 | - | 216 | 702 | - | 1,619 | - | 534 | 3,077 | 3,077 | - | - | - | 2,093 | - | - | - | 223,008 | 392 | - |
| 2a.3.3 | Small tool allowance | - | 324 | - | - | - | - | - | 49 | 373 | 336 | - | 37 | - | - | - | - | - | - | - | - |
| 2a.3.4 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 24,119 | 3,618 | 27,737 | - | 27,737 | - | - | - | - | - | - | - | - | - |
| 2a.3.5 | Retention and Severance | - | - | - | - | - | - | 13,127 | 1,969 | 15,097 | 15,097 | - | - | - | - | - | - | - | - | - | - |
| 2a.3 | Subtotal Period 2a Collateral Costs | 91 | 324 | 274 | 804 | - | 1,851 | 37,247 | 6,292 | 46,882 | 19,107 | 27,737 | 37 | - | 2,625 | - | - | - | 254,950 | 495 | - |
| Period 2a Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 2a.4.1 | Decon supplies | 112 | - | - | - | - | - | - | 28 | 140 | 140 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.2 | Insurance | - | - | - | - | - | - | 1,019 | 102 | 1,121 | 1,121 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.3 | Property taxes | - | - | - | - | - | - | 4,377 | 438 | 4,814 | 4,814 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.4 | Health physics supplies | - | 2,356 | - | - | - | - | - | 589 | 2,945 | 2,945 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.5 | Heavy equipment rental | - | 3,627 | - | - | - | - | - | 544 | 4,171 | 4,171 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.6 | Disposal of DAW generated | - | - | 110 | 57 | - | 457 | - | 134 | 758 | 758 | - | - | 5,551 | - | - | - | - | 111,023 | 181 | - |
| 2a.4.7 | Plant energy budget | - | - | - | - | - | - | 2,501 | 375 | 2,876 | 2,876 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.8 | NRC Fees | - | - | - | - | - | - | 856 | 86 | 942 | 942 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.9 | Emergency Planning Fees | - | - | - | - | - | - | 4,115 | 412 | 4,527 | - | 4,527 | - | - | - | - | - | - | - | - | - |
| 2a.4.10 | Fixed Overhead | - | - | - | - | - | - | 3,071 | 461 | 3,532 | 3,532 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.11 | Spent Fuel Pool O&M | - | - | - | - | - | - | 1,224 | 184 | 1,408 | - | 1,408 | - | - | - | - | - | - | - | - | - |
| 2a.4.12 | ISFSI Operating Costs | - | - | - | - | - | - | 162 | 24 | 187 | - | 187 | - | - | - | - | - | - | - | - | - |
| 2a.4.13 | Railroad Track Maintenance | - | - | - | - | - | - | 181 | 27 | 208 | 208 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.14 | Remedial Actions Surveys | - | - | - | - | - | - | 1,624 | 244 | 1,867 | 1,867 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.15 | Security Staff Cost | - | - | - | - | - | - | 21,881 | 3,282 | 25,164 | 25,164 | - | - | - | - | - | - | - | - | - | 325,574 |
| 2a.4.16 | DOC Staff Cost | - | - | - | - | - | - | 21,021 | 3,153 | 24,174 | 24,174 | - | - | - | - | - | - | - | - | - | 229,108 |
| 2a.4.17 | Utility Staff Cost | - | - | - | - | - | - | 27,906 | 4,186 | 32,092 | 32,092 | - | - | - | - | - | - | - | - | - | 426,562 |
| 2a.4 | Subtotal Period 2a Period-Dependent Costs | 112 | 5,982 | 110 | 57 | - | 457 | 89,938 | 14,267 | 110,924 | 104,803 | 6,121 | - | - | 5,551 | - | - | - | 111,023 | 181 | 981,244 |
| 2a.0 | TOTAL PERIOD 2a COST | 1,945 | 36,028 | 19,028 | 7,259 | 25,937 | 52,350 | 127,913 | 67,707 | 338,166 | 304,246 | 33,858 | 62 | 141,010 | 67,722 | 1,761 | 898 | - | 10,824,520 | 254,317 | 984,002 |
| PERIOD 2b - Site Decontamination | | | | | | | | | | | | | | | | | | | | | |
| Period 2b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| Disposal of Plant Systems | | | | | | | | | | | | | | | | | | | | | |
| 2b.1.1.1 | ALARA/Radiological | - | 18 | 0 | 1 | 6 | 3 | - | 6 | 35 | 35 | - | - | 35 | 10 | - | - | - | 2,060 | 277 | - |
| 2b.1.1.2 | Alternate N2 - RCA | - | 16 | 0 | 1 | 16 | - | - | 7 | 40 | 40 | - | - | 93 | - | - | - | - | 3,765 | 185 | - |
| 2b.1.1.3 | Decontamination Projects | - | 1 | 0 | 0 | 0 | 0 | - | 0 | 2 | 2 | - | - | 2 | 0 | - | - | - | 129 | 17 | - |
| 2b.1.1.4 | Electrical - Contaminated | - | 445 | 6 | 24 | 400 | 30 | - | 183 | 1,089 | 1,089 | - | - | 2,389 | 90 | - | - | - | 102,726 | 6,325 | - |
| 2b.1.1.5 | Electrical - Decontaminated | - | 2,698 | 48 | 218 | 3,906 | - | - | 1,298 | 8,167 | 8,167 | - | - | 23,344 | - | - | - | - | 948,013 | 37,107 | - |
| 2b.1.1.6 | Fire - RCA | - | 101 | 1 | 6 | 103 | - | - | 42 | 253 | 253 | - | - | 614 | - | - | - | - | 24,917 | 1,324 | - |
| 2b.1.1.7 | HVAC Ductwork | - | 305 | 7 | 27 | 446 | 34 | - | 156 | 975 | 975 | - | - | 2,665 | 100 | - | - | - | 114,598 | 4,111 | - |
| 2b.1.1.8 | HVAC/Chilled Water - RCA | - | 324 | 6 | 26 | 461 | - | - | 155 | 971 | 971 | - | - | 2,752 | - | - | - | - | 111,779 | 3,985 | - |
| 2b.1.1.9 | Heating & Ventilation | - | 483 | 16 | 61 | 1,007 | 76 | - | 302 | 1,945 | 1,945 | - | - | 6,018 | 227 | - | - | - | 258,789 | 7,101 | - |
| 2b.1.1.10 | Heating Boiler - Insulated - RCA | - | 3 | 0 | 0 | 4 | - | - | 1 | 9 | 9 | - | - | 26 | - | - | - | - | 1,058 | 35 | - |
| 2b.1.1.11 | Liquid Radwaste | 588 | 687 | 48 | 63 | 514 | 586 | - | 703 | 3,188 | 3,188 | - | - | 3,073 | 1,728 | - | - | - | 235,484 | 17,194 | - |
| 2b.1.1.12 | Makeup Demin - RCA | - | 103 | 3 | 14 | 246 | - | - | 65 | 431 | 431 | - | - | 1,471 | - | - | - | - | 59,747 | 1,412 | - |
| 2b.1.1.13 | Non-Essential Diesel Generator - RCA | - | 27 | 3 | 13 | 238 | - | - | 45 | 327 | 327 | - | - | 1,424 | - | - | - | - | 57,832 | 395 | - |
| 2b.1.1.14 | Off Gas Holdup | - | 342 | 21 | 38 | 461 | 214 | - | 216 | 1,291 | 1,291 | - | - | 2,755 | 630 | - | - | - | 152,277 | 4,769 | - |
| 2b.1.1.15 | Primary Containment | - | 455 | 42 | 87 | 1,038 | 507 | - | 414 | 2,543 | 2,543 | - | - | 6,201 | 1,506 | - | - | - | 347,704 | 6,454 | - |
| 2b.1.1.16 | Process Radiation Monitors | - | 46 | 2 | 2 | 24 | 18 | - | 20 | 111 | 111 | - | - | 142 | 52 | - | - | - | 9,115 | 649 | - |

**Monticello Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table E
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|---------------------------------------|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|-------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| Disposal of Plant Systems (continued) | | | | | | | | | | | | | | | | | | | | | | |
| 2b.1.1.17 | Rx Bldg Closed Cng Water - Insul - RCA | - | 114 | 2 | 9 | 163 | - | - | 54 | 343 | 343 | - | - | 977 | - | - | - | - | - | 39,675 | 1,484 | - |
| 2b.1.1.18 | Rx Bldg Closed Cng Water - RCA | - | 184 | 15 | 66 | 1,187 | - | - | 235 | 1,687 | 1,687 | - | - | 7,093 | - | - | - | - | - | 288,031 | 2,489 | - |
| 2b.1.1.19 | Rx Component Handling Equip | 27 | 142 | 18 | 27 | 194 | 279 | - | 154 | 840 | 840 | - | - | 1,158 | 829 | - | - | - | - | 99,730 | 2,462 | - |
| 2b.1.1.20 | Rx Pressure Vessel | 28 | 47 | 6 | 5 | 13 | 78 | - | 48 | 225 | 225 | - | - | 75 | 230 | - | - | - | - | 17,816 | 1,051 | - |
| 2b.1.1.21 | Rx Water Cleanup | 172 | 265 | 19 | 16 | 22 | 251 | - | 222 | 965 | 965 | - | - | 130 | 737 | - | - | - | - | 52,670 | 5,736 | - |
| 2b.1.1.22 | Secondary Containment | - | 124 | 7 | 14 | 170 | 86 | - | 81 | 483 | 483 | - | - | 1,017 | 255 | - | - | - | - | 57,567 | 1,763 | - |
| 2b.1.1.23 | Service & Seal Water - Insulated - RCA | - | 120 | 2 | 11 | 197 | - | - | 62 | 392 | 392 | - | - | 1,180 | - | - | - | - | - | 47,917 | 1,565 | - |
| 2b.1.1.24 | Service & Seal Water - RCA | - | 159 | 4 | 17 | 303 | - | - | 88 | 570 | 570 | - | - | 1,809 | - | - | - | - | - | 73,453 | 2,016 | - |
| 2b.1.1.25 | Service Air Blower - RCA | - | 15 | 0 | 2 | 34 | - | - | 9 | 62 | 62 | - | - | 206 | - | - | - | - | - | 8,364 | 206 | - |
| 2b.1.1.26 | Solid Radwaste | 338 | 494 | 36 | 49 | 399 | 467 | - | 480 | 2,264 | 2,264 | - | - | 2,387 | 1,380 | - | - | - | - | 185,221 | 10,820 | - |
| 2b.1.1.27 | Structures & Buildings | - | 78 | 2 | 5 | 60 | 29 | - | 37 | 210 | 210 | - | - | 357 | 85 | - | - | - | - | 19,933 | 1,128 | - |
| 2b.1.1.28 | Wells & Domestic Water | - | 10 | - | - | - | - | - | 1 | 11 | - | - | 11 | - | - | - | - | - | - | - | 144 | - |
| 2b.1.1.29 | Wells & Domestic Water - RCA | - | 52 | 1 | 3 | 57 | - | - | 22 | 136 | 136 | - | - | 342 | - | - | - | - | - | 13,874 | 633 | - |
| 2b.1.1 | Totals | 1,153 | 7,860 | 315 | 804 | 11,668 | 2,657 | - | 5,107 | 29,563 | 29,552 | - | 11 | 69,735 | 7,859 | - | - | - | - | 3,334,244 | 122,835 | - |
| 2b.1.2 | Scaffolding in support of decommissioning | - | 2,831 | 28 | 16 | 239 | 38 | - | 758 | 3,909 | 3,909 | - | - | 1,287 | 114 | - | - | - | - | 65,139 | 28,205 | - |
| Decontamination of Site Buildings | | | | | | | | | | | | | | | | | | | | | | |
| 2b.1.3.1 | Reactor Building | 5,202 | 2,903 | 178 | 516 | 8,044 | 1,181 | - | 4,924 | 22,948 | 22,948 | - | - | 48,077 | 7,014 | - | - | - | - | 2,317,670 | 112,518 | - |
| 2b.1.3.2 | Admin | 106 | 6 | 0 | 3 | - | 15 | - | 59 | 189 | 189 | - | - | - | 145 | - | - | - | - | 6,840 | 1,600 | - |
| 2b.1.3.3 | HPCI Room | 29 | 28 | 1 | 3 | 20 | 14 | - | 29 | 123 | 123 | - | - | 118 | 125 | - | - | - | - | 10,759 | 789 | - |
| 2b.1.3.4 | Hot Shop | 17 | 4 | 0 | 2 | - | 11 | - | 12 | 46 | 46 | - | - | - | 103 | - | - | - | - | 4,860 | 286 | - |
| 2b.1.3.5 | LLRW Storage & Shipping | 58 | 24 | 2 | 8 | 5 | 45 | - | 48 | 191 | 191 | - | - | 31 | 433 | - | - | - | - | 21,708 | 1,127 | - |
| 2b.1.3.6 | Offgas Stack | 372 | 269 | 7 | 23 | 225 | 82 | - | 312 | 1,289 | 1,289 | - | - | 1,343 | 669 | - | - | - | - | 87,045 | 8,860 | - |
| 2b.1.3.7 | Offgas Storage & Compressor | 41 | 17 | 1 | 6 | 4 | 33 | - | 34 | 136 | 136 | - | - | 25 | 316 | - | - | - | - | 15,948 | 785 | - |
| 2b.1.3.8 | Radwaste | 121 | 61 | 3 | 17 | 29 | 96 | - | 107 | 435 | 435 | - | - | 172 | 910 | - | - | - | - | 49,943 | 2,503 | - |
| 2b.1.3.9 | Radwaste Material Storage Warehouse | 64 | 24 | 2 | 9 | - | 52 | - | 52 | 202 | 202 | - | - | - | 495 | - | - | - | - | 23,400 | 1,197 | - |
| 2b.1.3.10 | Recombiner | 27 | 25 | 1 | 5 | 33 | 24 | - | 32 | 148 | 148 | - | - | 199 | 216 | - | - | - | - | 18,405 | 695 | - |
| 2b.1.3.11 | Turbine | 705 | 353 | 21 | 104 | 215 | 564 | - | 632 | 2,594 | 2,594 | - | - | 1,283 | 5,299 | - | - | - | - | 303,150 | 14,443 | - |
| 2b.1.3.12 | Turbine Building Addition | 58 | 21 | 1 | 8 | - | 45 | - | 47 | 181 | 181 | - | - | - | 434 | - | - | - | - | 20,478 | 1,087 | - |
| 2b.1.3 | Totals | 6,799 | 3,736 | 218 | 704 | 8,574 | 2,164 | - | 6,288 | 28,483 | 28,483 | - | - | 51,247 | 16,159 | - | - | - | - | 2,880,206 | 145,889 | - |
| 2b.1.4 | Prepare/submit License Termination Plan | - | - | - | - | - | - | 526 | 79 | 605 | 605 | - | - | - | - | - | - | - | - | - | - | 4,096 |
| 2b.1.5 | Receive NRC approval of termination plan | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 2b.1 | Subtotal Period 2b Activity Costs | 7,952 | 14,427 | 560 | 1,524 | 20,481 | 4,859 | 526 | 12,232 | 62,561 | 62,549 | - | 11 | 122,269 | 24,132 | - | - | - | - | 6,279,589 | 296,929 | 4,096 |
| Period 2b Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 2b.2.1 | Operational Equipment | - | - | 23 | 92 | 1,211 | - | - | 198 | 1,524 | 1,524 | - | - | 11,760 | - | - | - | - | - | 294,000 | 32 | - |
| 2b.2.2 | Excavation of Underground Services | - | 1,972 | - | - | - | - | 376 | 550 | 2,898 | 2,898 | - | - | - | - | - | - | - | - | - | 12,493 | - |
| 2b.2.3 | Security Modifications | - | - | - | - | - | - | 8,696 | 1,304 | 10,000 | 10,000 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.2 | Subtotal Period 2b Additional Costs | - | 1,972 | 23 | 92 | 1,211 | - | 9,072 | 2,052 | 14,422 | 14,422 | - | - | 11,760 | - | - | - | - | - | 294,000 | 12,525 | - |
| Period 2b Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 2b.3.1 | Process decommissioning water waste | 198 | - | 135 | 240 | - | 546 | - | 285 | 1,404 | 1,404 | - | - | - | 1,253 | - | - | - | - | 75,186 | 244 | - |
| 2b.3.2 | Process decommissioning chemical flush waste | 1 | - | 43 | 138 | - | 319 | - | 105 | 607 | 607 | - | - | - | 413 | - | - | - | - | 43,978 | 77 | - |
| 2b.3.3 | Small tool allowance | - | 364 | - | - | - | - | - | 55 | 418 | 418 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.3.4 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 117,254 | 17,588 | 134,843 | - | 134,843 | - | - | - | - | - | - | - | - | - | - |
| 2b.3.5 | Retention and Severance | - | - | - | - | - | - | 6,299 | 945 | 7,244 | 7,244 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.3 | Subtotal Period 2b Collateral Costs | 199 | 364 | 178 | 378 | - | 865 | 123,554 | 18,978 | 144,516 | 9,673 | 134,843 | - | - | 1,666 | - | - | - | - | 119,165 | 322 | - |
| Period 2b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 2b.4.1 | Decon supplies | 1,440 | - | - | - | - | - | - | 360 | 1,799 | 1,799 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.2 | Insurance | - | - | - | - | - | - | 742 | 74 | 816 | 816 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.3 | Property taxes | - | - | - | - | - | - | 2,703 | 270 | 2,974 | 2,974 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.4 | Health physics supplies | - | 2,376 | - | - | - | - | - | 594 | 2,970 | 2,970 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.5 | Heavy equipment rental | - | 2,711 | - | - | - | - | - | 407 | 3,117 | 3,117 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.6 | Disposal of DAW generated | - | - | 101 | 52 | - | 419 | - | 123 | 694 | 694 | - | - | - | 5,084 | - | - | - | - | 101,679 | 166 | - |
| 2b.4.7 | Plant energy budget | - | - | - | - | - | - | 1,437 | 216 | 1,653 | 1,653 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.8 | NRC Fees | - | - | - | - | - | - | 623 | 62 | 685 | 685 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.9 | Emergency Planning Fees | - | - | - | - | - | - | 2,995 | 299 | 3,294 | - | 3,294 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.10 | Fixed Overhead | - | - | - | - | - | - | 2,235 | 335 | 2,570 | 2,570 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.11 | Spent Fuel Pool O&M | - | - | - | - | - | - | 891 | 134 | 1,024 | - | 1,024 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.12 | Liquid Radwaste Processing Equipment/Services | - | - | - | - | - | - | 224 | 34 | 258 | 258 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.13 | ISFSI Operating Costs | - | - | - | - | - | - | 118 | 18 | 136 | - | 136 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.14 | Railroad Track Maintenance | - | - | - | - | - | - | 458 | 69 | 527 | 527 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.15 | Remedial Actions Surveys | - | - | - | - | - | - | 1,182 | 177 | 1,359 | 1,359 | - | - | - | - | - | - | - | - | - | - | - |

**Monticello Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table E
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|---------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| Period 2b Period-Dependent Costs (continued) | | | | | | | | | | | | | | | | | | | | | | |
| 2b.4.16 | Security Staff Cost | - | - | - | - | - | - | 15,925 | 2,389 | 18,314 | 18,314 | - | - | - | - | - | - | - | - | - | 236,949 | |
| 2b.4.17 | DOC Staff Cost | - | - | - | - | - | - | 14,772 | 2,216 | 16,988 | 16,988 | - | - | - | - | - | - | - | - | - | 160,160 | |
| 2b.4.18 | Utility Staff Cost | - | - | - | - | - | - | 19,442 | 2,916 | 22,358 | 22,358 | - | - | - | - | - | - | - | - | - | 297,283 | |
| 2b.4 | Subtotal Period 2b Period-Dependent Costs | 1,440 | 5,087 | 101 | 52 | - | 419 | 63,747 | 10,692 | 81,536 | 77,082 | 4,455 | - | - | 5,084 | - | - | - | - | 101,679 | 166 | 694,392 |
| 2b.0 | TOTAL PERIOD 2b COST | 9,591 | 21,850 | 861 | 2,046 | 21,692 | 6,143 | 196,899 | 43,954 | 303,035 | 163,726 | 139,297 | 11 | 134,029 | 30,882 | - | - | - | - | 6,794,433 | 309,941 | 698,488 |
| PERIOD 2d - Decontamination Following Wet Fuel Storage | | | | | | | | | | | | | | | | | | | | | | |
| Period 2d Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| 2d.1.1 | Remove spent fuel racks | 654 | 58 | 103 | 149 | - | 2,572 | - | 1,017 | 4,553 | 4,553 | - | - | - | 7,653 | - | - | - | - | 486,170 | 906 | - |
| Disposal of Plant Systems | | | | | | | | | | | | | | | | | | | | | | |
| 2d.1.2.1 | Cranes/Heavy Loads/Rigging - RCA | - | 3 | 0 | 1 | 17 | - | - | 4 | 25 | 25 | - | - | 103 | - | - | - | - | - | 4,184 | 48 | - |
| 2d.1.2.2 | Electrical - Contaminated Fuel Pool | - | 47 | 1 | 2 | 40 | 3 | - | 19 | 112 | 112 | - | - | 240 | 9 | - | - | - | - | 10,334 | 665 | - |
| 2d.1.2.3 | Electrical - Decontam. Fuel Pool Area | - | 297 | 5 | 23 | 411 | - | - | 140 | 876 | 876 | - | - | 2,457 | - | - | - | - | - | 99,783 | 4,090 | - |
| 2d.1.2.4 | Fire - RCA - Fuel Pool Area | - | 11 | 0 | 1 | 10 | - | - | 4 | 26 | 26 | - | - | 62 | - | - | - | - | - | 2,499 | 143 | - |
| 2d.1.2.5 | Fuel Pool Cooling & Cleanup | 246 | 428 | 34 | 37 | 197 | 455 | - | 382 | 1,781 | 1,781 | - | - | 1,179 | 1,341 | - | - | - | - | 133,939 | 8,380 | - |
| 2d.1.2.6 | Fuel Pool Cooling & Cleanup - Insulated | 27 | 41 | 3 | 3 | 11 | 40 | - | 36 | 161 | 161 | - | - | 67 | 117 | - | - | - | - | 10,220 | 848 | - |
| 2d.1.2.7 | HVAC Ductwork - Fuel Pool Area | - | 34 | 1 | 3 | 50 | 4 | - | 17 | 108 | 108 | - | - | 296 | 11 | - | - | - | - | 12,733 | 457 | - |
| 2d.1.2.8 | HVAC/Chilled Water - RCA Fuel Pool Area | - | 33 | 0 | 2 | 37 | - | - | 14 | 87 | 87 | - | - | 223 | - | - | - | - | - | 9,072 | 397 | - |
| 2d.1.2.9 | Instrument & Service Air-RCA-Fuel Pool | - | 29 | 1 | 2 | 45 | - | - | 14 | 91 | 91 | - | - | 267 | - | - | - | - | - | 10,841 | 357 | - |
| 2d.1.2 | Totals | 273 | 924 | 45 | 75 | 819 | 502 | - | 631 | 3,268 | 3,268 | - | - | 4,894 | 1,479 | - | - | - | - | 293,606 | 15,385 | - |
| Decontamination of Site Buildings | | | | | | | | | | | | | | | | | | | | | | |
| 2d.1.3.1 | Reactor (Post Fuel) | 946 | 2,599 | 172 | 913 | 329 | 10,216 | - | 3,880 | 19,056 | 19,056 | - | - | 1,969 | 62,698 | - | - | - | - | 2,732,406 | 45,703 | - |
| 2d.1.3 | Totals | 946 | 2,599 | 172 | 913 | 329 | 10,216 | - | 3,880 | 19,056 | 19,056 | - | - | 1,969 | 62,698 | - | - | - | - | 2,732,406 | 45,703 | - |
| 2d.1.4 | Scaffolding in support of decommissioning | - | 566 | 6 | 3 | 48 | 8 | - | 152 | 782 | 782 | - | - | 257 | 23 | - | - | - | - | 13,028 | 5,641 | - |
| 2d.1 | Subtotal Period 2d Activity Costs | 1,872 | 4,147 | 326 | 1,139 | 1,196 | 13,298 | - | 5,680 | 27,659 | 27,659 | - | - | 7,120 | 71,852 | - | - | - | - | 3,525,210 | 67,635 | - |
| Period 2d Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 2d.2.1 | License Termination Survey Planning | - | - | - | - | - | - | 1,458 | 437 | 1,896 | 1,896 | - | - | - | - | - | - | - | - | - | - | 12,480 |
| 2d.2 | Subtotal Period 2d Additional Costs | - | - | - | - | - | - | 1,458 | 437 | 1,896 | 1,896 | - | - | - | - | - | - | - | - | - | - | 12,480 |
| Period 2d Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 2d.3.1 | Process decommissioning water waste | 79 | - | 54 | 96 | - | 220 | - | 114 | 563 | 563 | - | - | - | 504 | - | - | - | - | 30,239 | 98 | - |
| 2d.3.2 | Process decommissioning chemical flush waste | 1 | - | 26 | 84 | - | 193 | - | 64 | 366 | 366 | - | - | - | 249 | - | - | - | - | 26,553 | 47 | - |
| 2d.3.3 | Small tool allowance | - | 91 | - | - | - | - | - | 14 | 105 | 105 | - | - | - | - | - | - | - | - | - | - | - |
| 2d.3.4 | Decommissioning Equipment Disposition | - | - | 130 | 82 | 1,112 | 178 | - | 237 | 1,739 | 1,739 | - | - | 6,000 | 529 | - | - | - | - | 303,608 | 147 | - |
| 2d.3.5 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 27 | 4 | 32 | - | 32 | - | - | - | - | - | - | - | - | - | - |
| 2d.3 | Subtotal Period 2d Collateral Costs | 80 | 91 | 210 | 262 | 1,112 | 590 | 27 | 432 | 2,805 | 2,773 | 32 | - | 6,000 | 1,282 | - | - | - | - | 360,400 | 292 | - |
| Period 2d Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 2d.4.1 | Decon supplies | 244 | - | - | - | - | - | - | 61 | 305 | 305 | - | - | - | - | - | - | - | - | - | - | - |
| 2d.4.2 | Insurance | - | - | - | - | - | - | 530 | 53 | 583 | 583 | - | - | - | - | - | - | - | - | - | - | - |
| 2d.4.3 | Property taxes | - | - | - | - | - | - | 1,664 | 166 | 1,830 | 1,830 | - | - | - | - | - | - | - | - | - | - | - |
| 2d.4.4 | Health physics supplies | - | 806 | - | - | - | - | - | 202 | 1,008 | 1,008 | - | - | - | - | - | - | - | - | - | - | - |
| 2d.4.5 | Heavy equipment rental | - | 1,936 | - | - | - | - | - | 290 | 2,227 | 2,227 | - | - | - | - | - | - | - | - | - | - | - |
| 2d.4.6 | Disposal of DAW generated | - | - | 40 | 21 | - | 167 | - | 49 | 277 | 277 | - | - | 2,030 | - | - | - | - | - | 40,600 | 66 | - |
| 2d.4.7 | Plant energy budget | - | - | - | - | - | - | 547 | 82 | 630 | 630 | - | - | - | - | - | - | - | - | - | - | - |
| 2d.4.8 | NRC Fees | - | - | - | - | - | - | 424 | 42 | 466 | 466 | - | - | - | - | - | - | - | - | - | - | - |
| 2d.4.9 | Emergency Planning Fees | - | - | - | - | - | - | 112 | 11 | 123 | - | 123 | - | - | - | - | - | - | - | - | - | - |
| 2d.4.10 | Fixed Overhead | - | - | - | - | - | - | 1,597 | 239 | 1,836 | 1,836 | - | - | - | - | - | - | - | - | - | - | - |
| 2d.4.11 | Liquid Radwaste Processing Equipment/Services | - | - | - | - | - | - | 320 | 48 | 368 | 368 | - | - | - | - | - | - | - | - | - | - | - |
| 2d.4.12 | ISFSI Operating Costs | - | - | - | - | - | - | 84 | 13 | 97 | - | 97 | - | - | - | - | - | - | - | - | - | - |
| 2d.4.13 | Railroad Track Maintenance | - | - | - | - | - | - | 94 | 14 | 108 | 108 | - | - | - | - | - | - | - | - | - | - | - |
| 2d.4.14 | Remedial Actions Surveys | - | - | - | - | - | - | 844 | 127 | 971 | 971 | - | - | - | - | - | - | - | - | - | - | - |
| 2d.4.15 | Security Staff Cost | - | - | - | - | - | - | 10,999 | 1,650 | 12,649 | 8,918 | 3,732 | - | - | - | - | - | - | - | - | - | 162,981 |
| 2d.4.16 | DOC Staff Cost | - | - | - | - | - | - | 7,311 | 1,097 | 8,408 | 8,408 | - | - | - | - | - | - | - | - | - | - | 78,356 |
| 2d.4.17 | Utility Staff Cost | - | - | - | - | - | - | 10,052 | 1,508 | 11,560 | 10,670 | 890 | - | - | - | - | - | - | - | - | - | 149,660 |
| 2d.4 | Subtotal Period 2d Period-Dependent Costs | 244 | 2,743 | 40 | 21 | - | 167 | 34,579 | 5,652 | 43,446 | 38,604 | 4,842 | - | 2,030 | - | - | - | - | - | 40,600 | 66 | 390,997 |
| 2d.0 | TOTAL PERIOD 2d COST | 2,196 | 6,981 | 576 | 1,422 | 2,308 | 14,055 | 36,065 | 12,202 | 75,806 | 70,932 | 4,873 | - | 13,120 | 75,164 | - | - | - | - | 3,926,210 | 67,993 | 403,477 |

**Monticello Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table E
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|---|---|---------------|---------------|-----------------|-----------------|---------------------------|---------------------|----------------|-------------------|----------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|---------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| PERIOD 2f - License Termination | | | | | | | | | | | | | | | | | | | | | | |
| Period 2f Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| 2f.1.1 | ORISE confirmatory survey | - | - | - | - | - | - | 166 | 50 | 216 | 216 | - | - | - | - | - | - | - | - | - | - | |
| 2f.1.2 | Terminate license | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - | |
| 2f.1 | Subtotal Period 2f Activity Costs | - | - | - | - | - | - | 166 | 50 | 216 | 216 | - | - | - | - | - | - | - | - | - | - | |
| Period 2f Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 2f.2.1 | License Termination Survey | - | - | - | - | - | - | 6,920 | 2,076 | 8,995 | 8,995 | - | - | - | - | - | - | - | - | - | 95,048 | 6,240 |
| 2f.2 | Subtotal Period 2f Additional Costs | - | - | - | - | - | - | 6,920 | 2,076 | 8,995 | 8,995 | - | - | - | - | - | - | - | - | - | 95,048 | 6,240 |
| Period 2f Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 2f.3.1 | DOC staff relocation expenses | - | - | - | - | - | - | 1,264 | 190 | 1,454 | 1,454 | - | - | - | - | - | - | - | - | - | - | - |
| 2f.3.2 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 47 | 7 | 54 | - | 54 | - | - | - | - | - | - | - | - | - | - |
| 2f.3 | Subtotal Period 2f Collateral Costs | - | - | - | - | - | - | 1,311 | 197 | 1,508 | 1,454 | 54 | - | - | - | - | - | - | - | - | - | - |
| Period 2f Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 2f.4.1 | Insurance | - | - | - | - | - | - | 530 | 53 | 583 | 583 | - | - | - | - | - | - | - | - | - | - | - |
| 2f.4.2 | Property taxes | - | - | - | - | - | - | 1,470 | 147 | 1,617 | 1,617 | - | - | - | - | - | - | - | - | - | - | - |
| 2f.4.3 | Health physics supplies | - | 708 | - | - | - | - | - | 177 | 884 | 884 | - | - | - | - | - | - | - | - | - | - | - |
| 2f.4.4 | Disposal of DAW generated | - | - | 7 | 4 | - | 29 | - | 9 | 48 | 48 | - | - | 355 | - | - | - | - | - | 7,097 | 12 | - |
| 2f.4.5 | Plant energy budget | - | - | - | - | - | - | 274 | 41 | 315 | 315 | - | - | - | - | - | - | - | - | - | - | - |
| 2f.4.6 | NRC Fees | - | - | - | - | - | - | 426 | 43 | 468 | 468 | - | - | - | - | - | - | - | - | - | - | - |
| 2f.4.7 | Emergency Planning Fees | - | - | - | - | - | - | 112 | 11 | 123 | - | 123 | - | - | - | - | - | - | - | - | - | - |
| 2f.4.8 | Fixed Overhead | - | - | - | - | - | - | 1,597 | 239 | 1,836 | 1,836 | - | - | - | - | - | - | - | - | - | - | - |
| 2f.4.9 | ISFSI Operating Costs | - | - | - | - | - | - | 84 | 13 | 97 | - | 97 | - | - | - | - | - | - | - | - | - | - |
| 2f.4.10 | Railroad Track Maintenance | - | - | - | - | - | - | 94 | 14 | 108 | 108 | - | - | - | - | - | - | - | - | - | - | - |
| 2f.4.11 | Security Staff Cost | - | - | - | - | - | - | 10,999 | 1,650 | 12,649 | 8,918 | 3,732 | - | - | - | - | - | - | - | - | - | 162,981 |
| 2f.4.12 | DOC Staff Cost | - | - | - | - | - | - | 5,393 | 809 | 6,201 | 6,201 | - | - | - | - | - | - | - | - | - | - | 57,200 |
| 2f.4.13 | Utility Staff Cost | - | - | - | - | - | - | 5,762 | 864 | 6,626 | 5,738 | 888 | - | - | - | - | - | - | - | - | - | 80,707 |
| 2f.4 | Subtotal Period 2f Period-Dependent Costs | - | 708 | 7 | 4 | - | 29 | 26,740 | 4,070 | 31,557 | 26,718 | 4,839 | - | - | 355 | - | - | - | - | 7,097 | 12 | 300,888 |
| 2f.0 | TOTAL PERIOD 2f COST | - | 708 | 7 | 4 | - | 29 | 35,137 | 6,392 | 42,276 | 37,382 | 4,893 | - | - | 355 | - | - | - | - | 7,097 | 95,059 | 307,128 |
| PERIOD 2 TOTALS | | 13,731 | 65,566 | 20,473 | 10,731 | 49,937 | 72,577 | 396,013 | 130,255 | 759,282 | 576,287 | 182,922 | 73 | 288,160 | 174,123 | 1,761 | 898 | - | 21,552,260 | 727,310 | 2,393,096 | |
| PERIOD 3b - Site Restoration | | | | | | | | | | | | | | | | | | | | | | |
| Period 3b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Demolition of Remaining Site Buildings | | | | | | | | | | | | | | | | | | | | | | |
| 3b.1.1.1 | Reactor Building | - | 1,971 | - | - | - | - | - | 296 | 2,267 | - | - | 2,267 | - | - | - | - | - | - | - | 13,911 | - |
| 3b.1.1.2 | Condensate Tanks Foundation | - | 10 | - | - | - | - | - | 1 | 11 | - | - | 11 | - | - | - | - | - | - | - | 50 | - |
| 3b.1.1.3 | Discharge Retention Basin | - | 4 | - | - | - | - | - | 1 | 5 | - | - | 5 | - | - | - | - | - | - | - | 25 | - |
| 3b.1.1.4 | HPCI Room | - | 19 | - | - | - | - | - | 3 | 22 | - | - | 22 | - | - | - | - | - | - | - | 97 | - |
| 3b.1.1.5 | Hot Shop | - | 16 | - | - | - | - | - | 2 | 19 | - | - | 19 | - | - | - | - | - | - | - | 177 | - |
| 3b.1.1.6 | Hydrogen & Oxygen Storage | - | 2 | - | - | - | - | - | 0 | 2 | - | - | 2 | - | - | - | - | - | - | - | 19 | - |
| 3b.1.1.7 | LLRW Storage & Shipping | - | 83 | - | - | - | - | - | 12 | 95 | - | - | 95 | - | - | - | - | - | - | - | 662 | - |
| 3b.1.1.8 | MSIV | - | 4 | - | - | - | - | - | 1 | 4 | - | - | 4 | - | - | - | - | - | - | - | 42 | - |
| 3b.1.1.9 | Misc Structures 2017 | - | 1,410 | - | - | - | - | - | 212 | 1,622 | - | - | 1,622 | - | - | - | - | - | - | - | 13,042 | - |
| 3b.1.1.10 | Offgas Stack | - | 108 | - | - | - | - | - | 16 | 124 | - | - | 124 | - | - | - | - | - | - | - | 544 | - |
| 3b.1.1.11 | Offgas Storage & Compressor | - | 39 | - | - | - | - | - | 6 | 45 | - | - | 45 | - | - | - | - | - | - | - | 199 | - |
| 3b.1.1.12 | Radwaste | - | 228 | - | - | - | - | - | 34 | 262 | - | - | 262 | - | - | - | - | - | - | - | 1,220 | - |
| 3b.1.1.13 | Recombiner | - | 128 | - | - | - | - | - | 19 | 147 | - | - | 147 | - | - | - | - | - | - | - | 713 | - |
| 3b.1.1.14 | Security Barrier | - | 186 | - | - | - | - | - | 28 | 214 | - | - | 214 | - | - | - | - | - | - | - | 933 | - |
| 3b.1.1.15 | Structures Greater than 3' Below Grade | - | 2,461 | - | - | - | - | - | 369 | 2,830 | - | - | 2,830 | - | - | - | - | - | - | - | 12,649 | - |
| 3b.1.1.16 | Tank Farm | - | 4 | - | - | - | - | - | 1 | 5 | - | - | 5 | - | - | - | - | - | - | - | 21 | - |
| 3b.1.1.17 | Turbine | - | 1,259 | - | - | - | - | - | 189 | 1,448 | - | - | 1,448 | - | - | - | - | - | - | - | 13,036 | - |
| 3b.1.1.18 | Turbine Building Addition | - | 55 | - | - | - | - | - | 8 | 63 | - | - | 63 | - | - | - | - | - | - | - | 618 | - |
| 3b.1.1.19 | Turbine Pedestal | - | 182 | - | - | - | - | - | 27 | 209 | - | - | 209 | - | - | - | - | - | - | - | 926 | - |
| 3b.1.1 | Totals | - | 8,169 | - | - | - | - | - | 1,225 | 9,394 | - | - | 9,394 | - | - | - | - | - | - | - | 58,885 | - |
| Site Closeout Activities | | | | | | | | | | | | | | | | | | | | | | |
| 3b.1.2 | Grade & landscape site | - | 896 | - | - | - | - | - | 134 | 1,031 | - | - | 1,031 | - | - | - | - | - | - | - | 1,841 | - |
| 3b.1.3 | Final report to NRC | - | - | - | - | - | - | 200 | 30 | 231 | 231 | - | - | - | - | - | - | - | - | - | - | 1,560 |
| 3b.1 | Subtotal Period 3b Activity Costs | - | 9,065 | - | - | - | - | 200 | 1,390 | 10,655 | 231 | - | 10,425 | - | - | - | - | - | - | - | 60,726 | 1,560 |

**Monticello Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table E
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|-----------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| Period 3b Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3b.2.1 | Clean Concrete Disposal | - | 3,322 | - | - | - | - | 13 | 500 | 3,835 | - | - | 3,835 | - | - | - | - | - | - | - | 12 | - |
| 3b.2.2 | Intake Structure Cofferdam | - | 335 | - | - | - | - | - | 50 | 385 | - | - | 385 | - | - | - | - | - | - | - | 2,584 | - |
| 3b.2.3 | Construction Debris | - | - | - | - | - | - | 1,170 | 176 | 1,346 | - | - | 1,346 | - | - | - | - | - | - | - | - | - |
| 3b.2.4 | Backfill | - | 5,583 | - | - | - | - | - | 837 | 6,421 | - | - | 6,421 | - | - | - | - | - | - | - | 5,422 | - |
| 3b.2.5 | Discharge Structure Cofferdam | - | 442 | - | - | - | - | - | 66 | 508 | - | - | 508 | - | - | - | - | - | - | - | 3,552 | - |
| 3b.2.6 | Disposition of Original MPC Canisters | - | 55 | 185 | 954 | - | 5,641 | - | 1,709 | 8,544 | 8,544 | - | - | - | 21,097 | - | - | - | - | 2,505,700 | 337 | - |
| 3b.2 | Subtotal Period 3b Additional Costs | - | 9,737 | 185 | 954 | - | 5,641 | 1,183 | 3,339 | 21,039 | 8,544 | - | 12,495 | - | 21,097 | - | - | - | - | 2,505,700 | 11,907 | - |
| Period 3b Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3b.3.1 | Small tool allowance | - | 111 | - | - | - | - | - | 17 | 127 | - | - | 127 | - | - | - | - | - | - | - | - | - |
| 3b.3.2 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 108 | 16 | 125 | - | 125 | - | - | - | - | - | - | - | - | - | - |
| 3b.3 | Subtotal Period 3b Collateral Costs | - | 111 | - | - | - | - | 108 | 33 | 252 | - | 125 | 127 | - | - | - | - | - | - | - | - | - |
| Period 3b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3b.4.1 | Insurance | - | - | - | - | - | - | 1,220 | 122 | 1,342 | 1,342 | - | - | - | - | - | - | - | - | - | - | - |
| 3b.4.2 | Property taxes | - | - | - | - | - | - | 2,540 | 254 | 2,794 | - | 2,794 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.3 | Heavy equipment rental | - | 5,842 | - | - | - | - | - | 876 | 6,719 | - | - | 6,719 | - | - | - | - | - | - | - | - | - |
| 3b.4.4 | Plant energy budget | - | - | - | - | - | - | 315 | 47 | 362 | - | 362 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.5 | NRC ISFSI Fees | - | - | - | - | - | - | 356 | 36 | 391 | - | 391 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.6 | Emergency Planning Fees | - | - | - | - | - | - | 257 | 26 | 283 | - | 283 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.7 | Fixed Overhead | - | - | - | - | - | - | 1,122 | 168 | 1,290 | 429 | 860 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.8 | ISFSI Operating Costs | - | - | - | - | - | - | 194 | 29 | 223 | - | 223 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.9 | Railroad Track Maintenance | - | - | - | - | - | - | 543 | 81 | 624 | 249 | 375 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.10 | Security Staff Cost | - | - | - | - | - | - | 25,319 | 3,798 | 29,117 | 0 | 8,589 | 20,527 | - | - | - | - | - | - | - | - | 375,152 |
| 3b.4.11 | DOC Staff Cost | - | - | - | - | - | - | 11,729 | 1,759 | 13,489 | - | - | 13,489 | - | - | - | - | - | - | - | - | 122,646 |
| 3b.4.12 | Utility Staff Cost | - | - | - | - | - | - | 7,148 | 1,072 | 8,220 | - | 2,129 | 6,091 | - | - | - | - | - | - | - | - | 101,904 |
| 3b.4 | Subtotal Period 3b Period-Dependent Costs | - | 5,842 | - | - | - | - | 50,742 | 8,269 | 64,854 | 2,020 | 16,007 | 46,826 | - | - | - | - | - | - | - | - | 599,702 |
| 3b.0 | TOTAL PERIOD 3b COST | - | 24,755 | 185 | 954 | - | 5,641 | 52,234 | 13,030 | 96,800 | 10,795 | 16,132 | 69,873 | - | 21,097 | - | - | - | - | 2,505,700 | 72,633 | 601,262 |
| PERIOD 3c - Fuel Storage Operations/Shipping | | | | | | | | | | | | | | | | | | | | | | |
| Period 3c Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Period 3c Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3c.3.1 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 553,074 | 82,961 | 636,035 | - | 636,035 | - | - | - | - | - | - | - | - | - | - |
| 3c.3 | Subtotal Period 3c Collateral Costs | - | - | - | - | - | - | 553,074 | 82,961 | 636,035 | - | 636,035 | - | - | - | - | - | - | - | - | - | - |
| Period 3c Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3c.4.1 | Insurance | - | - | - | - | - | - | 65,480 | 6,548 | 72,028 | - | 72,028 | - | - | - | - | - | - | - | - | - | - |
| 3c.4.2 | Property taxes | - | - | - | - | - | - | 84,567 | 8,457 | 93,024 | - | 93,024 | - | - | - | - | - | - | - | - | - | - |
| 3c.4.4 | NRC ISFSI Fees | - | - | - | - | - | - | 20,571 | 2,057 | 22,628 | - | 22,628 | - | - | - | - | - | - | - | - | - | - |
| 3c.4.5 | Emergency Planning Fees | - | - | - | - | - | - | 13,803 | 1,380 | 15,183 | - | 15,183 | - | - | - | - | - | - | - | - | - | - |
| 3c.4.6 | Fixed Overhead | - | - | - | - | - | - | 20,053 | 3,008 | 23,061 | - | 23,061 | - | - | - | - | - | - | - | - | - | - |
| 3c.4.7 | ISFSI Operating Costs | - | - | - | - | - | - | 10,420 | 1,563 | 11,983 | - | 11,983 | - | - | - | - | - | - | - | - | - | - |
| 3c.4.8 | Railroad Track Maintenance | - | - | - | - | - | - | 11,641 | 1,746 | 13,387 | - | 13,387 | - | - | - | - | - | - | - | - | - | - |
| 3c.4.9 | Security Staff Cost | - | - | - | - | - | - | 400,396 | 60,059 | 460,455 | - | 460,455 | - | - | - | - | - | - | - | - | - | 5,034,774 |
| 3c.4.10 | DOC Staff Cost | - | - | - | - | - | - | 28,541 | 4,281 | 32,822 | - | 32,822 | - | - | - | - | - | - | - | - | - | 193,645 |
| 3c.4.11 | Utility Staff Cost | - | - | - | - | - | - | 177,875 | 26,681 | 204,556 | - | 204,556 | - | - | - | - | - | - | - | - | - | 2,565,798 |
| 3c.4 | Subtotal Period 3c Period-Dependent Costs | - | - | - | - | - | - | 833,346 | 115,781 | 949,127 | - | 949,127 | - | - | - | - | - | - | - | - | - | 7,794,217 |
| 3c.0 | TOTAL PERIOD 3c COST | - | - | - | - | - | - | 1,386,420 | 198,742 | 1,585,162 | - | 1,585,162 | - | - | - | - | - | - | - | - | - | 7,794,217 |
| PERIOD 3d - GTCC shipping | | | | | | | | | | | | | | | | | | | | | | |
| Period 3d Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Nuclear Steam Supply System Removal | | | | | | | | | | | | | | | | | | | | | | |
| 3d.1.1.1 | Vessel & Internals GTCC Disposal | - | - | 1,083 | - | - | 4,313 | - | 918 | 6,314 | 6,314 | - | - | - | - | - | - | - | 1,160 | 225,765 | - | - |
| 3d.1.1 | Totals | - | - | 1,083 | - | - | 4,313 | - | 918 | 6,314 | 6,314 | - | - | - | - | - | - | - | 1,160 | 225,765 | - | - |
| 3d.1 | Subtotal Period 3d Activity Costs | - | - | 1,083 | - | - | 4,313 | - | 918 | 6,314 | 6,314 | - | - | - | - | - | - | - | 1,160 | 225,765 | - | - |
| Period 3d Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3d.3.1 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 28 | 4 | 32 | - | 32 | - | - | - | - | - | - | - | - | - | - |
| 3d.3 | Subtotal Period 3d Collateral Costs | - | - | - | - | - | - | 28 | 4 | 32 | - | 32 | - | - | - | - | - | - | - | - | - | - |

**Monticello Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table E
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|--------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| Period 3d Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3d.4.1 | Insurance | - | - | - | - | - | - | 27 | 3 | 30 | 30 | - | - | - | - | - | - | - | - | - | - | |
| 3d.4.2 | Property taxes | - | - | - | - | - | - | 35 | 3 | 38 | 38 | - | - | - | - | - | - | - | - | - | - | |
| 3d.4.4 | NRC ISFSI Fees | - | - | - | - | - | - | 8 | 1 | 9 | - | 9 | - | - | - | - | - | - | - | - | - | |
| 3d.4.5 | Emergency Planning Fees | - | - | - | - | - | - | 6 | 1 | 6 | - | 6 | - | - | - | - | - | - | - | - | - | |
| 3d.4.6 | Fixed Overhead | - | - | - | - | - | - | 8 | 1 | 10 | 10 | - | - | - | - | - | - | - | - | - | - | |
| 3d.4.7 | Railroad Track Maintenance | - | - | - | - | - | - | 5 | 1 | 6 | 6 | - | - | - | - | - | - | - | - | - | - | |
| 3d.4.8 | Security Staff Cost | - | - | - | - | - | - | 165 | 25 | 190 | 190 | - | - | - | - | - | - | - | - | - | 2,074 | |
| 3d.4.9 | Utility Staff Cost | - | - | - | - | - | - | 39 | 6 | 45 | 45 | - | - | - | - | - | - | - | - | - | 539 | |
| 3d.4 | Subtotal Period 3d Period-Dependent Costs | - | - | - | - | - | - | 293 | 40 | 333 | 318 | 15 | - | - | - | - | - | - | - | - | 2,613 | |
| 3d.0 | TOTAL PERIOD 3d COST | - | - | 1,083 | - | - | 4,313 | 321 | 962 | 6,678 | 6,632 | 47 | - | - | - | - | - | 1,160 | 225,765 | - | 2,613 | |
| PERIOD 3e - ISFSI Decontamination | | | | | | | | | | | | | | | | | | | | | | |
| Period 3e Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Period 3e Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3e.2.1 | License Termination ISFSI | - | 0 | 3 | 33 | - | 283 | 2,086 | 602 | 3,008 | 3,008 | - | - | - | 848 | - | - | - | - | 131,507 | 10,502 | 2,225 |
| 3e.2 | Subtotal Period 3e Additional Costs | - | 0 | 3 | 33 | - | 283 | 2,086 | 602 | 3,008 | 3,008 | - | - | - | 848 | - | - | - | - | 131,507 | 10,502 | 2,225 |
| Period 3e Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3e.4.1 | Insurance | - | - | - | - | - | - | 118 | 30 | 148 | 148 | - | - | - | - | - | - | - | - | - | - | |
| 3e.4.2 | Property taxes | - | - | - | - | - | - | 249 | 62 | 312 | 312 | - | - | - | - | - | - | - | - | - | - | |
| 3e.4.3 | Plant energy budget | - | - | - | - | - | - | 12 | 3 | 15 | 15 | - | - | - | - | - | - | - | - | - | - | |
| 3e.4.4 | Fixed Overhead | - | - | - | - | - | - | 71 | 18 | 89 | 89 | - | - | - | - | - | - | - | - | - | - | |
| 3e.4.5 | Railroad Track Maintenance | - | - | - | - | - | - | 41 | 10 | 52 | 52 | - | - | - | - | - | - | - | - | - | - | |
| 3e.4.6 | Security Staff Cost | - | - | - | - | - | - | 352 | 88 | 440 | 440 | - | - | - | - | - | - | - | - | - | 4,999 | |
| 3e.4.7 | Utility Staff Cost | - | - | - | - | - | - | 261 | 65 | 326 | 326 | - | - | - | - | - | - | - | - | - | 3,792 | |
| 3e.4 | Subtotal Period 3e Period-Dependent Costs | - | - | - | - | - | - | 1,105 | 276 | 1,381 | 1,381 | - | - | - | - | - | - | - | - | - | 8,792 | |
| 3e.0 | TOTAL PERIOD 3e COST | - | 0 | 3 | 33 | - | 283 | 3,191 | 878 | 4,389 | 4,389 | - | - | - | 848 | - | - | - | - | 131,507 | 10,502 | 11,017 |
| PERIOD 3f - ISFSI Site Restoration | | | | | | | | | | | | | | | | | | | | | | |
| Period 3f Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Period 3f Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3f.2.1 | Demolition and Site Restoration of ISFSI | - | 1,564 | - | - | - | - | 256 | 273 | 2,093 | - | - | 2,093 | - | - | - | - | - | - | - | 7,309 | 160 |
| 3f.2 | Subtotal Period 3f Additional Costs | - | 1,564 | - | - | - | - | 256 | 273 | 2,093 | - | - | 2,093 | - | - | - | - | - | - | - | 7,309 | 160 |
| Period 3f Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3f.3.1 | Small tool allowance | - | 11 | - | - | - | - | - | 2 | 12 | - | - | 12 | - | - | - | - | - | - | - | - | - |
| 3f.3 | Subtotal Period 3f Collateral Costs | - | 11 | - | - | - | - | - | 2 | 12 | - | - | 12 | - | - | - | - | - | - | - | - | - |
| Period 3f Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3f.4.2 | Property taxes | - | - | - | - | - | - | 126 | 13 | 138 | - | - | 138 | - | - | - | - | - | - | - | - | - |
| 3f.4.3 | Heavy equipment rental | - | 117 | - | - | - | - | - | 17 | 134 | - | - | 134 | - | - | - | - | - | - | - | - | - |
| 3f.4.4 | Plant energy budget | - | - | - | - | - | - | 6 | 1 | 7 | - | - | 7 | - | - | - | - | - | - | - | - | |
| 3f.4.5 | Fixed Overhead | - | - | - | - | - | - | 36 | 5 | 41 | - | - | 41 | - | - | - | - | - | - | - | - | |
| 3f.4.6 | Railroad Track Maintenance | - | - | - | - | - | - | 21 | 3 | 24 | - | - | 24 | - | - | - | - | - | - | - | - | |
| 3f.4.7 | Security Staff Cost | - | - | - | - | - | - | 177 | 27 | 204 | - | - | 204 | - | - | - | - | - | - | - | 2,520 | |
| 3f.4.8 | Utility Staff Cost | - | - | - | - | - | - | 109 | 16 | 126 | - | - | 126 | - | - | - | - | - | - | - | 1,564 | |
| 3f.4 | Subtotal Period 3f Period-Dependent Costs | - | 117 | - | - | - | - | 475 | 82 | 674 | - | - | 674 | - | - | - | - | - | - | - | 4,084 | |
| 3f.0 | TOTAL PERIOD 3f COST | - | 1,691 | - | - | - | - | 731 | 357 | 2,779 | - | - | 2,779 | - | - | - | - | - | - | - | 7,309 | 4,244 |
| PERIOD 3 TOTALS | | | | | | | | | | | | | | | | | | | | | | |
| TOTAL COST TO DECOMMISSION | | | | | | | | | | | | | | | | | | | | | | |
| | | 17,263 | 95,300 | 21,839 | 11,878 | 49,952 | 84,522 | 1,995,558 | 369,559 | 2,645,871 | 776,228 | 1,795,906 | 73,737 | 288,203 | 197,266 | 1,992 | 898 | 1,160 | 24,478,380 | 849,601 | 11,998,960 | |

**Monticello Nuclear Generating Plant
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**Table E
 Monticello Nuclear Generating Plant
 DECON Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
 (Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|--|----------------------|------------|--------------|-----------------|--------------------|----------------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| TOTAL COST TO DECOMMISSION WITH 16.23% CONTINGENCY: | | | | | \$2,645,871 | thousands of 2020 dollars | | | | | | | | | | | | | | | |
| TOTAL NRC LICENSE TERMINATION COST IS 29.34% OR: | | | | | \$776,228 | thousands of 2020 dollars | | | | | | | | | | | | | | | |
| SPENT FUEL MANAGEMENT COST IS 67.88% OR: | | | | | \$1,795,906 | thousands of 2020 dollars | | | | | | | | | | | | | | | |
| NON-NUCLEAR DEMOLITION COST IS 2.79% OR: | | | | | \$73,737 | thousands of 2020 dollars | | | | | | | | | | | | | | | |
| TOTAL LOW-LEVEL RADIOACTIVE WASTE VOLUME BURIED (EXCLUDING GTCC): | | | | | 200,155 | Cubic Feet | | | | | | | | | | | | | | | |
| TOTAL GREATER THAN CLASS C RADWASTE VOLUME GENERATED: | | | | | 1,160 | Cubic Feet | | | | | | | | | | | | | | | |
| TOTAL SCRAP METAL REMOVED: | | | | | 23,123 | Tons | | | | | | | | | | | | | | | |
| TOTAL CRAFT LABOR REQUIREMENTS: | | | | | 849,601 | Man-hours | | | | | | | | | | | | | | | |

End Notes:
 n/a - indicates that this activity not charged as decommissioning expense
 a - indicates that this activity performed by decommissioning staff
 0 - indicates that this value is less than 0.5 but is non-zero
 A cell containing " - " indicates a zero value

***Monticello Nuclear Generating Plant
Decommissioning Cost Analysis***

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APPENDIX F

DETAILED COST ANALYSIS

SCENARIO 4: DECON with 200 Year DFS

**Monticello Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table F
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|--|--|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| PERIOD 1a - Shutdown through Transition | | | | | | | | | | | | | | | | | | | | | |
| Period 1a Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| 1a.1.1 | Prepare preliminary decommissioning cost | - | - | - | - | - | - | 167 | 25 | 192 | 192 | - | - | - | - | - | - | - | - | - | 1,300 |
| 1a.1.2 | Notification of Cessation of Operations | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.3 | Remove fuel & source material | - | - | - | - | - | - | - | - | n/a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.4 | Notification of Permanent Defueling | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.5 | Deactivate plant systems & process waste | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.6 | Prepare and submit PSDAR | - | - | - | - | - | - | 257 | 39 | 296 | 296 | - | - | - | - | - | - | - | - | - | 2,000 |
| 1a.1.7 | Review plant dwgs & specs. | - | - | - | - | - | - | 591 | 89 | 680 | 680 | - | - | - | - | - | - | - | - | - | 4,600 |
| 1a.1.8 | Perform detailed rad survey | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.9 | Estimate by-product inventory | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| 1a.1.10 | End product description | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| 1a.1.11 | Detailed by-product inventory | - | - | - | - | - | - | 167 | 25 | 192 | 192 | - | - | - | - | - | - | - | - | - | 1,300 |
| 1a.1.12 | Define major work sequence | - | - | - | - | - | - | 964 | 145 | 1,108 | 1,108 | - | - | - | - | - | - | - | - | - | 7,500 |
| 1a.1.13 | Perform SER and EA | - | - | - | - | - | - | 398 | 60 | 458 | 458 | - | - | - | - | - | - | - | - | - | 3,100 |
| 1a.1.14 | Prepare/submit Defueled Technical Specifications | - | - | - | - | - | - | 964 | 145 | 1,108 | 1,108 | - | - | - | - | - | - | - | - | - | 7,500 |
| 1a.1.15 | Perform Site-Specific Cost Study | - | - | - | - | - | - | 643 | 96 | 739 | 739 | - | - | - | - | - | - | - | - | - | 5,000 |
| 1a.1.16 | Prepare/submit Irradiated Fuel Management Plan | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| Activity Specifications | | | | | | | | | | | | | | | | | | | | | |
| 1a.1.17.1 | Plant & temporary facilities | - | - | - | - | - | - | 632 | 95 | 727 | 654 | - | 73 | - | - | - | - | - | - | - | 4,920 |
| 1a.1.17.2 | Plant systems | - | - | - | - | - | - | 536 | 80 | 616 | 554 | - | 62 | - | - | - | - | - | - | - | 4,167 |
| 1a.1.17.3 | NSSS Decontamination Flush | - | - | - | - | - | - | 64 | 10 | 74 | 74 | - | - | - | - | - | - | - | - | - | 500 |
| 1a.1.17.4 | Reactor internals | - | - | - | - | - | - | 912 | 137 | 1,049 | 1,049 | - | - | - | - | - | - | - | - | - | 7,100 |
| 1a.1.17.5 | Reactor vessel | - | - | - | - | - | - | 835 | 125 | 961 | 961 | - | - | - | - | - | - | - | - | - | 6,500 |
| 1a.1.17.6 | Sacrificial shield | - | - | - | - | - | - | 64 | 10 | 74 | 74 | - | - | - | - | - | - | - | - | - | 500 |
| 1a.1.17.7 | Moisture separators/reheaters | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| 1a.1.17.8 | Reinforced concrete | - | - | - | - | - | - | 206 | 31 | 236 | 118 | - | 118 | - | - | - | - | - | - | - | 1,600 |
| 1a.1.17.9 | Main Turbine | - | - | - | - | - | - | 268 | 40 | 309 | 309 | - | - | - | - | - | - | - | - | - | 2,088 |
| 1a.1.17.10 | Main Condensers | - | - | - | - | - | - | 268 | 40 | 309 | 309 | - | - | - | - | - | - | - | - | - | 2,088 |
| 1a.1.17.11 | Pressure suppression structure | - | - | - | - | - | - | 257 | 39 | 296 | 296 | - | - | - | - | - | - | - | - | - | 2,000 |
| 1a.1.17.12 | Drywell | - | - | - | - | - | - | 206 | 31 | 236 | 236 | - | - | - | - | - | - | - | - | - | 1,600 |
| 1a.1.17.13 | Plant structures & buildings | - | - | - | - | - | - | 401 | 60 | 461 | 231 | - | 231 | - | - | - | - | - | - | - | 3,120 |
| 1a.1.17.14 | Waste management | - | - | - | - | - | - | 591 | 89 | 680 | 680 | - | - | - | - | - | - | - | - | - | 4,600 |
| 1a.1.17.15 | Facility & site closeout | - | - | - | - | - | - | 116 | 17 | 133 | 67 | - | 67 | - | - | - | - | - | - | - | 900 |
| 1a.1.17 | Total | - | - | - | - | - | - | 5,486 | 823 | 6,308 | 5,759 | - | 550 | - | - | - | - | - | - | - | 42,683 |
| Planning & Site Preparations | | | | | | | | | | | | | | | | | | | | | |
| 1a.1.18 | Prepare dismantling sequence | - | - | - | - | - | - | 308 | 46 | 355 | 355 | - | - | - | - | - | - | - | - | - | 2,400 |
| 1a.1.19 | Plant prep. & temp. svces | - | - | - | - | - | - | 3,500 | 525 | 4,025 | 4,025 | - | - | - | - | - | - | - | - | - | - |
| 1a.1.20 | Design water clean-up system | - | - | - | - | - | - | 180 | 27 | 207 | 207 | - | - | - | - | - | - | - | - | - | 1,400 |
| 1a.1.21 | Rigging/Cont. Cntrl Envlps/tooling/etc. | - | - | - | - | - | - | 2,400 | 360 | 2,760 | 2,760 | - | - | - | - | - | - | - | - | - | - |
| 1a.1.22 | Procure casks/liners & containers | - | - | - | - | - | - | 158 | 24 | 182 | 182 | - | - | - | - | - | - | - | - | - | 1,230 |
| 1a.1 | Subtotal Period 1a Activity Costs | - | - | - | - | - | - | 16,569 | 2,485 | 19,054 | 18,505 | - | 550 | - | - | - | - | - | - | - | 83,013 |
| Period 1a Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 1a.3.1 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 1,323 | 198 | 1,522 | - | 1,522 | - | - | - | - | - | - | - | - | - |
| 1a.3.2 | Retention and Severance | - | - | - | - | - | - | 9,892 | 1,484 | 11,376 | 11,376 | - | - | - | - | - | - | - | - | - | - |
| 1a.3 | Subtotal Period 1a Collateral Costs | - | - | - | - | - | - | 11,215 | 1,682 | 12,897 | 11,376 | 1,522 | - | - | - | - | - | - | - | - | - |
| Period 1a Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 1a.4.1 | Insurance | - | - | - | - | - | - | 2,328 | 233 | 2,561 | 2,561 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.2 | Property taxes | - | - | - | - | - | - | 3,570 | 357 | 3,927 | 3,927 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.3 | Health physics supplies | - | 614 | - | - | - | - | - | 153 | 767 | 767 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.4 | Heavy equipment rental | - | 753 | - | - | - | - | - | 113 | 866 | 866 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.5 | Disposal of DAW generated | - | - | 12 | 6 | - | 50 | - | 15 | 83 | 83 | - | - | 610 | - | - | - | - | 12,190 | 20 | - |
| 1a.4.6 | Plant energy budget | - | - | - | - | - | - | 1,817 | 272 | 2,089 | 2,089 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.7 | NRC Fees | - | - | - | - | - | - | 1,137 | 114 | 1,251 | 1,251 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.8 | Emergency Planning Fees | - | - | - | - | - | - | 3,428 | 343 | 3,770 | - | 3,770 | - | - | - | - | - | - | - | - | - |
| 1a.4.9 | Fixed Overhead | - | - | - | - | - | - | 2,616 | 392 | 3,009 | 3,009 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.10 | Spent Fuel Pool O&M | - | - | - | - | - | - | 845 | 127 | 971 | - | 971 | - | - | - | - | - | - | - | - | - |
| 1a.4.11 | ISFSI Operating Costs | - | - | - | - | - | - | 112 | 17 | 129 | - | 129 | - | - | - | - | - | - | - | - | - |
| 1a.4.12 | Railroad Track Maintenance | - | - | - | - | - | - | 125 | 19 | 144 | 144 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.13 | Security Staff Cost | - | - | - | - | - | - | 16,372 | 2,456 | 18,827 | 18,827 | - | - | - | - | - | - | - | - | - | 245,440 |
| 1a.4.14 | Utility Staff Cost | - | - | - | - | - | - | 27,285 | 4,093 | 31,378 | 31,378 | - | - | - | - | - | - | - | - | - | 422,240 |
| 1a.4 | Subtotal Period 1a Period-Dependent Costs | - | 1,367 | 12 | 6 | - | 50 | 59,634 | 8,703 | 69,772 | 64,902 | 4,870 | - | 610 | - | - | - | - | 12,190 | 20 | 667,680 |

**Monticello Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table F
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|--|--------------|--------------|-----------------|-----------------|---------------------------|---------------------|----------------|-------------------|----------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| 1a.0 | TOTAL PERIOD 1a COST | - | 1,367 | 12 | 6 | - | 50 | 87,418 | 12,871 | 101,724 | 94,783 | 6,392 | 550 | - | 610 | - | - | - | 12,190 | 20 | 750,693 |
| PERIOD 1b - Decommissioning Preparations | | | | | | | | | | | | | | | | | | | | | |
| Period 1b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| Detailed Work Procedures | | | | | | | | | | | | | | | | | | | | | |
| 1b.1.1.1 | Plant systems | - | - | - | - | - | - | 608 | 91 | 700 | 630 | - | 70 | - | - | - | - | - | - | - | 4,733 |
| 1b.1.1.2 | NSSS Decontamination Flush | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| 1b.1.1.3 | Reactor internals | - | - | - | - | - | - | 514 | 77 | 591 | 591 | - | - | - | - | - | - | - | - | - | 4,000 |
| 1b.1.1.4 | Remaining buildings | - | - | - | - | - | - | 174 | 26 | 200 | 50 | - | 150 | - | - | - | - | - | - | - | 1,350 |
| 1b.1.1.5 | CRD housings & NIs | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| 1b.1.1.6 | Incore instrumentation | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| 1b.1.1.7 | Removal primary containment | - | - | - | - | - | - | 257 | 39 | 296 | 296 | - | - | - | - | - | - | - | - | - | 2,000 |
| 1b.1.1.8 | Reactor vessel | - | - | - | - | - | - | 467 | 70 | 537 | 537 | - | - | - | - | - | - | - | - | - | 3,630 |
| 1b.1.1.9 | Facility closeout | - | - | - | - | - | - | 154 | 23 | 177 | 89 | - | 89 | - | - | - | - | - | - | - | 1,200 |
| 1b.1.1.10 | Sacrificial shield | - | - | - | - | - | - | 154 | 23 | 177 | 177 | - | - | - | - | - | - | - | - | - | 1,200 |
| 1b.1.1.11 | Reinforced concrete | - | - | - | - | - | - | 129 | 19 | 148 | 74 | - | 74 | - | - | - | - | - | - | - | 1,000 |
| 1b.1.1.12 | Main Turbine | - | - | - | - | - | - | 267 | 40 | 307 | 307 | - | - | - | - | - | - | - | - | - | 2,080 |
| 1b.1.1.13 | Main Condensers | - | - | - | - | - | - | 268 | 40 | 309 | 309 | - | - | - | - | - | - | - | - | - | 2,088 |
| 1b.1.1.14 | Moisture separators & reheaters | - | - | - | - | - | - | 257 | 39 | 296 | 296 | - | - | - | - | - | - | - | - | - | 2,000 |
| 1b.1.1.15 | Radwaste building | - | - | - | - | - | - | 351 | 53 | 403 | 363 | - | 40 | - | - | - | - | - | - | - | 2,730 |
| 1b.1.1.16 | Reactor building | - | - | - | - | - | - | 351 | 53 | 403 | 363 | - | 40 | - | - | - | - | - | - | - | 2,730 |
| 1b.1.1 | Total | - | - | - | - | - | - | 4,336 | 650 | 4,987 | 4,524 | - | 463 | - | - | - | - | - | - | - | 33,741 |
| 1b.1.2 | Decon NSSS | 296 | - | - | - | - | - | - | 148 | 444 | 444 | - | - | - | - | - | - | - | - | 1,067 | - |
| 1b.1 | Subtotal Period 1b Activity Costs | 296 | - | - | - | - | - | 4,336 | 798 | 5,431 | 4,968 | - | 463 | - | - | - | - | - | - | 1,067 | 33,741 |
| Period 1b Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 1b.2.1 | Spent Fuel Pool Isolation | - | - | - | - | - | - | 12,675 | 1,901 | 14,576 | 14,576 | - | - | - | - | - | - | - | - | - | - |
| 1b.2.2 | Site Characterization | - | - | - | - | - | - | 5,930 | 1,779 | 7,708 | 7,708 | - | - | - | - | - | - | - | - | - | 30,500 |
| 1b.2.3 | Mixed & RCRA Waste | - | - | 28 | 29 | 14 | - | - | 9 | 80 | 80 | - | - | 43 | - | - | - | - | 5,253 | 161 | 10,852 |
| 1b.2 | Subtotal Period 1b Additional Costs | - | - | 28 | 29 | 14 | - | 18,605 | 3,689 | 22,365 | 22,365 | - | - | 43 | - | - | - | - | 5,253 | 30,661 | 10,852 |
| Period 1b Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 1b.3.1 | Decon equipment | 1,055 | - | - | - | - | - | - | 158 | 1,213 | 1,213 | - | - | - | - | - | - | - | - | - | - |
| 1b.3.2 | DOC staff relocation expenses | - | - | - | - | - | - | 1,264 | 190 | 1,454 | 1,454 | - | - | - | - | - | - | - | - | - | - |
| 1b.3.3 | Process decommissioning water waste | 38 | - | 25 | 45 | - | 102 | - | 53 | 263 | 263 | - | - | - | 233 | - | - | - | - | 13,991 | 45 |
| 1b.3.4 | Process decommissioning chemical flush waste | 1 | - | 24 | 77 | - | 1,526 | - | 396 | 2,024 | 2,024 | - | - | - | - | 231 | - | - | - | 24,599 | 43 |
| 1b.3.5 | Small tool allowance | - | 2 | - | - | - | - | - | 0 | 2 | 2 | - | - | - | - | - | - | - | - | - | - |
| 1b.3.6 | Pipe cutting equipment | - | 1,200 | - | - | - | - | - | 180 | 1,380 | 1,380 | - | - | - | - | - | - | - | - | - | - |
| 1b.3.7 | Decon rig | 2,104 | - | - | - | - | - | - | 316 | 2,419 | 2,419 | - | - | - | - | - | - | - | - | - | - |
| 1b.3.8 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 2,735 | 410 | 3,145 | - | 3,145 | - | - | - | - | - | - | - | - | - |
| 1b.3.9 | Retention and Severance | - | - | - | - | - | - | 6,335 | 950 | 7,285 | 7,285 | - | - | - | - | - | - | - | - | - | - |
| 1b.3 | Subtotal Period 1b Collateral Costs | 3,197 | 1,202 | 49 | 122 | - | 1,628 | 10,334 | 2,653 | 19,185 | 16,040 | 3,145 | - | - | 233 | 231 | - | - | 38,589 | 89 | - |
| Period 1b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 1b.4.1 | Decon supplies | 39 | - | - | - | - | - | - | 10 | 48 | 48 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.2 | Insurance | - | - | - | - | - | - | 1,161 | 116 | 1,277 | 1,277 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.3 | Property taxes | - | - | - | - | - | - | 1,709 | 171 | 1,880 | 1,880 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.4 | Health physics supplies | - | 344 | - | - | - | - | - | 86 | 430 | 430 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.5 | Heavy equipment rental | - | 375 | - | - | - | - | - | 56 | 432 | 432 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.6 | Disposal of DAW generated | - | - | 7 | 4 | - | 29 | - | 9 | 49 | 49 | - | - | - | 356 | - | - | - | 7,122 | 12 | - |
| 1b.4.7 | Plant energy budget | - | - | - | - | - | - | 1,812 | 272 | 2,083 | 2,083 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.8 | NRC Fees | - | - | - | - | - | - | 323 | 32 | 355 | 355 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.9 | Emergency Planning Fees | - | - | - | - | - | - | 1,416 | 142 | 1,557 | - | 1,557 | - | - | - | - | - | - | - | - | - |
| 1b.4.10 | Fixed Overhead | - | - | - | - | - | - | 1,305 | 196 | 1,500 | 1,500 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.11 | Spent Fuel Pool O&M | - | - | - | - | - | - | 421 | 63 | 484 | - | 484 | - | - | - | - | - | - | - | - | - |
| 1b.4.12 | ISFSI Operating Costs | - | - | - | - | - | - | 56 | 8 | 64 | - | 64 | - | - | - | - | - | - | - | - | - |
| 1b.4.13 | Railroad Track Maintenance | - | - | - | - | - | - | 62 | 9 | 72 | 72 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.14 | Security Staff Cost | - | - | - | - | - | - | 8,163 | 1,225 | 9,388 | 9,388 | - | - | - | - | - | - | - | - | - | 122,384 |
| 1b.4.15 | DOC Staff Cost | - | - | - | - | - | - | 5,846 | 877 | 6,723 | 6,723 | - | - | - | - | - | - | - | - | - | 63,266 |
| 1b.4.16 | Utility Staff Cost | - | - | - | - | - | - | 13,682 | 2,052 | 15,734 | 15,734 | - | - | - | - | - | - | - | - | - | 211,579 |
| 1b.4 | Subtotal Period 1b Period-Dependent Costs | 39 | 719 | 7 | 4 | - | 29 | 35,955 | 5,323 | 42,076 | 39,970 | 2,106 | - | - | 356 | - | - | - | 7,122 | 12 | 397,229 |
| 1b.0 | TOTAL PERIOD 1b COST | 3,531 | 1,921 | 84 | 154 | 14 | 1,657 | 69,230 | 12,465 | 89,056 | 83,343 | 5,251 | 463 | 43 | 589 | 231 | - | - | 50,964 | 31,828 | 441,822 |
| PERIOD 1 TOTALS | | 3,531 | 3,288 | 96 | 160 | 14 | 1,707 | 156,648 | 25,335 | 190,780 | 178,125 | 11,643 | 1,012 | 43 | 1,199 | 231 | - | - | 63,155 | 31,848 | 1,192,515 |

**Monticello Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table F
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|--|--|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| PERIOD 2a - Large Component Removal | | | | | | | | | | | | | | | | | | | | | |
| Period 2a Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| Nuclear Steam Supply System Removal | | | | | | | | | | | | | | | | | | | | | |
| 2a.1.1.1 | Recirculation System Piping & Valves | 111 | 94 | 27 | 50 | - | 528 | - | 221 | 1,031 | 1,031 | - | - | - | 1,430 | - | - | - | 99,742 | 2,905 | - |
| 2a.1.1.2 | Recirculation Pumps & Motors | 40 | 63 | 16 | 51 | 42 | 539 | - | 186 | 938 | 938 | - | - | 96 | 945 | - | - | - | 112,200 | 1,563 | - |
| 2a.1.1.3 | CRDMs & NIs Removal | 194 | 1,020 | 415 | 135 | - | 1,130 | - | 696 | 3,591 | 3,591 | - | - | - | 3,741 | - | - | - | 213,700 | 17,768 | - |
| 2a.1.1.4 | Reactor Vessel Internals | 244 | 6,722 | 12,852 | 2,696 | - | 29,845 | 364 | 24,027 | 76,749 | 76,749 | - | - | - | 1,252 | 1,761 | 898 | - | 343,150 | 30,515 | 1,379 |
| 2a.1.1.5 | Reactor Vessel | 113 | 9,121 | 2,672 | 1,167 | - | 5,861 | 364 | 10,842 | 30,140 | 30,140 | - | - | - | 16,169 | - | - | - | 1,105,210 | 30,515 | 1,379 |
| 2a.1.1 | Totals | 702 | 17,020 | 15,982 | 4,099 | 42 | 37,903 | 728 | 35,973 | 112,449 | 112,449 | - | - | 96 | 23,536 | 1,761 | 898 | - | 1,874,002 | 83,267 | 2,758 |
| Removal of Major Equipment | | | | | | | | | | | | | | | | | | | | | |
| 2a.1.2 | Main Turbine/Generator | - | 385 | 1,356 | 521 | 6,139 | 439 | - | 1,341 | 10,182 | 10,182 | - | - | 24,835 | 1,383 | - | - | - | 1,577,959 | 5,438 | - |
| 2a.1.3 | Main Condensers | - | 1,347 | 360 | 194 | 3,225 | 244 | - | 947 | 6,317 | 6,317 | - | - | 17,396 | 727 | - | - | - | 828,955 | 18,831 | - |
| Cascading Costs from Clean Building Demolition | | | | | | | | | | | | | | | | | | | | | |
| 2a.1.4.1 | Reactor Building | - | 332 | - | - | - | - | - | 50 | 381 | 381 | - | - | - | - | - | - | - | - | 2,217 | - |
| 2a.1.4.2 | Radwaste | - | 25 | - | - | - | - | - | 4 | 28 | 28 | - | - | - | - | - | - | - | - | 127 | - |
| 2a.1.4.3 | Turbine | - | 127 | - | - | - | - | - | 19 | 146 | 146 | - | - | - | - | - | - | - | - | 1,254 | - |
| 2a.1.4 | Totals | - | 483 | - | - | - | - | - | 72 | 556 | 556 | - | - | - | - | - | - | - | - | 3,598 | - |
| Disposal of Plant Systems | | | | | | | | | | | | | | | | | | | | | |
| 2a.1.5.1 | Automatic Press Relief | - | 118 | 7 | 12 | 134 | 70 | - | 70 | 410 | 410 | - | - | 803 | 206 | - | - | - | 45,852 | 1,656 | - |
| 2a.1.5.2 | Chemistry Sampling | - | 27 | 1 | 2 | 26 | 13 | - | 14 | 83 | 83 | - | - | 156 | 37 | - | - | - | 8,681 | 400 | - |
| 2a.1.5.3 | Chemistry Sampling - Insulated | - | 2 | 0 | 0 | - | 0 | - | 1 | 3 | 3 | - | - | - | 1 | - | - | - | 72 | 28 | - |
| 2a.1.5.4 | Circulating Water - RCA | - | 207 | 14 | 62 | 1,114 | - | - | 230 | 1,626 | 1,626 | - | - | 6,656 | - | - | - | - | 270,307 | 2,860 | - |
| 2a.1.5.5 | Combustible Gas Control - Insul - RCA | - | 29 | 0 | 2 | 36 | - | - | 13 | 80 | 80 | - | - | 212 | - | - | - | - | 8,617 | 378 | - |
| 2a.1.5.6 | Combustible Gas Control - RCA | - | 18 | 1 | 3 | 48 | - | - | 12 | 81 | 81 | - | - | 285 | - | - | - | - | 11,577 | 245 | - |
| 2a.1.5.7 | Condensate & Feedwater | - | 987 | 183 | 329 | 3,337 | 2,464 | - | 1,431 | 8,731 | 8,731 | - | - | 19,947 | 7,319 | - | - | - | 1,275,810 | 14,196 | - |
| 2a.1.5.8 | Condensate & Feedwater - Insulated | - | 492 | 34 | 63 | 699 | 408 | - | 343 | 2,038 | 2,038 | - | - | 4,176 | 1,207 | - | - | - | 246,693 | 6,964 | - |
| 2a.1.5.9 | Condensate Demin | - | 545 | 30 | 51 | 560 | 339 | - | 316 | 1,840 | 1,840 | - | - | 3,346 | 1,000 | - | - | - | 199,936 | 7,618 | - |
| 2a.1.5.10 | Condensate Storage | - | 726 | 33 | 82 | 1,193 | 270 | - | 444 | 2,748 | 2,748 | - | - | 7,131 | 795 | - | - | - | 340,568 | 10,345 | - |
| 2a.1.5.11 | Control Rod Drive | - | 3 | 0 | 0 | 3 | 1 | - | 2 | 9 | 9 | - | - | 19 | 4 | - | - | - | 1,009 | 41 | - |
| 2a.1.5.12 | Control Rod Drive Hydraulic | - | 416 | 16 | 26 | 277 | 190 | - | 199 | 1,124 | 1,124 | - | - | 1,658 | 562 | - | - | - | 103,306 | 5,898 | - |
| 2a.1.5.13 | Core Spray | - | 79 | 20 | 51 | 734 | 176 | - | 184 | 1,244 | 1,244 | - | - | 4,384 | 521 | - | - | - | 211,329 | 1,163 | - |
| 2a.1.5.14 | Core Spray - Insulated | - | 145 | 8 | 13 | 137 | 90 | - | 82 | 474 | 474 | - | - | 818 | 264 | - | - | - | 50,149 | 2,033 | - |
| 2a.1.5.15 | Demin Water - Insulated - RCA | - | 15 | 0 | 1 | 14 | - | - | 6 | 36 | 36 | - | - | 85 | - | - | - | - | 3,445 | 181 | - |
| 2a.1.5.16 | Demin Water - RCA | - | 41 | 1 | 2 | 42 | - | - | 17 | 104 | 104 | - | - | 253 | - | - | - | - | 10,278 | 508 | - |
| 2a.1.5.17 | Diesel Oil - RCA | - | 2 | 0 | 0 | 4 | - | - | 1 | 7 | 7 | - | - | 23 | - | - | - | - | 931 | 25 | - |
| 2a.1.5.18 | Drywell Atmosphere Cooling - RCA | - | 38 | 1 | 5 | 92 | - | - | 24 | 159 | 159 | - | - | 548 | - | - | - | - | 22,244 | 550 | - |
| 2a.1.5.19 | EDG Emerg Service Water - Insul - RCA | - | 0 | 0 | 0 | 0 | - | - | 0 | 1 | 1 | - | - | 2 | - | - | - | - | 84 | 4 | - |
| 2a.1.5.20 | Electrical - Clean | - | 13 | - | - | - | - | - | 2 | 15 | - | - | - | - | - | - | - | - | - | 182 | - |
| 2a.1.5.21 | Emergency Service Water - Insul - RCA | - | 21 | 0 | 1 | 23 | - | - | 9 | 55 | 55 | - | - | 137 | - | - | - | - | 5,544 | 281 | - |
| 2a.1.5.22 | Emergency Service Water - RCA | - | 2 | 0 | 0 | 2 | - | - | 1 | 5 | 5 | - | - | 13 | - | - | - | - | 512 | 22 | - |
| 2a.1.5.23 | GEZIP - RCA | - | 3 | 0 | 1 | 17 | - | - | 4 | 25 | 25 | - | - | 103 | - | - | - | - | 4,184 | 48 | - |
| 2a.1.5.24 | Generator Physical Design - RCA | - | 5 | 0 | 0 | 5 | - | - | 2 | 12 | 12 | - | - | 31 | - | - | - | - | 1,250 | 67 | - |
| 2a.1.5.25 | H2-O2 Control Analyzing | - | 6 | 0 | 0 | 1 | 5 | - | 3 | 15 | 15 | - | - | 6 | 13 | - | - | - | 1,080 | 81 | - |
| 2a.1.5.26 | H2-O2 Control Analyzing - Insulated | - | 6 | 0 | 0 | 1 | 5 | - | 3 | 15 | 15 | - | - | 6 | 13 | - | - | - | 1,080 | 81 | - |
| 2a.1.5.27 | High Pressure Coolant Injection | - | 67 | 6 | 13 | 163 | 70 | - | 61 | 381 | 381 | - | - | 972 | 209 | - | - | - | 52,792 | 966 | - |
| 2a.1.5.28 | High Pressure Coolant Injection - Insula | - | 219 | 14 | 24 | 267 | 163 | - | 141 | 830 | 830 | - | - | 1,598 | 481 | - | - | - | 95,733 | 3,079 | - |
| 2a.1.5.29 | Hydrogen Cooling | - | 8 | - | - | - | - | - | 1 | 10 | - | - | - | - | - | - | - | - | - | 118 | - |
| 2a.1.5.30 | Hydrogen Cooling - RCA | - | 7 | 0 | 0 | 7 | - | - | 3 | 17 | 17 | - | - | 39 | - | - | - | - | 1,600 | 79 | - |
| 2a.1.5.31 | Hydrogen Seal Oil - RCA | - | 17 | 0 | 2 | 32 | - | - | 9 | 60 | 60 | - | - | 189 | - | - | - | - | 7,669 | 212 | - |
| 2a.1.5.32 | Hydrogen Water Chemistry - RCA | - | 24 | 0 | 1 | 23 | - | - | 10 | 59 | 59 | - | - | 140 | - | - | - | - | 5,672 | 304 | - |
| 2a.1.5.33 | Instrument & Service Air - RCA | - | 225 | 4 | 17 | 296 | - | - | 103 | 644 | 644 | - | - | 1,768 | - | - | - | - | 71,810 | 2,733 | - |
| 2a.1.5.34 | Main Condenser | - | 196 | 12 | 20 | 223 | 139 | - | 122 | 712 | 712 | - | - | 1,333 | 411 | - | - | - | 80,439 | 2,746 | - |
| 2a.1.5.35 | Main Steam | - | 249 | 17 | 32 | 359 | 201 | - | 173 | 1,029 | 1,029 | - | - | 2,148 | 594 | - | - | - | 125,135 | 3,512 | - |
| 2a.1.5.36 | Main Turbine | - | 1,012 | 205 | 353 | 3,306 | 2,921 | - | 1,553 | 9,350 | 9,350 | - | - | 19,760 | 8,687 | - | - | - | 1,354,661 | 14,733 | - |
| 2a.1.5.37 | Main Turbine - Insulated | - | 214 | 18 | 37 | 423 | 225 | - | 180 | 1,097 | 1,097 | - | - | 2,530 | 667 | - | - | - | 145,208 | 3,069 | - |
| 2a.1.5.38 | Miscellaneous | - | 43 | 1 | 3 | 51 | - | - | 19 | 115 | 115 | - | - | 302 | - | - | - | - | 12,283 | 622 | - |
| 2a.1.5.39 | Off Gas Recombiner | - | 189 | 19 | 32 | 300 | 257 | - | 163 | 960 | 960 | - | - | 1,795 | 764 | - | - | - | 121,554 | 2,708 | - |
| 2a.1.5.40 | Off Gas Recombiner - Insulated | - | 387 | 19 | 27 | 229 | 240 | - | 197 | 1,100 | 1,100 | - | - | 1,366 | 709 | - | - | - | 100,933 | 5,385 | - |
| 2a.1.5.41 | Post Accident Sampling | - | 25 | 1 | 1 | 9 | 11 | - | 11 | 58 | 58 | - | - | 53 | 33 | - | - | - | 4,318 | 345 | - |
| 2a.1.5.42 | Post Accident Sampling - Insulated | - | 17 | 1 | 1 | 3 | 13 | - | 8 | 43 | 43 | - | - | 17 | 37 | - | - | - | 3,116 | 212 | - |
| 2a.1.5.43 | RHR Service Water - Insulated - RCA | - | 83 | 3 | 14 | 248 | - | - | 60 | 409 | 409 | - | - | 1,485 | - | - | - | - | 60,293 | 1,125 | - |
| 2a.1.5.44 | RHR Service Water - RCA | - | 4 | 0 | 0 | 6 | - | - | 2 | 12 | 12 | - | - | 35 | - | - | - | - | 1,410 | 57 | - |
| 2a.1.5.45 | Reactor Feedwater Pump Seal | - | 56 | 2 | 4 | 32 | 33 | - | 28 | 155 | 155 | - | - | 193 | 96 | - | - | - | 14,009 | 773 | - |

**Monticello Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table F
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| Disposal of Plant Systems (continued) | | | | | | | | | | | | | | | | | | | | | |
| 2a.1.5.46 | Residual Heat Removal | 362 | 252 | 172 | 178 | 1,072 | 2,051 | - | 962 | 5,049 | 5,049 | - | - | 6,406 | 6,012 | - | - | - | 647,941 | 4,135 | - |
| 2a.1.5.47 | Residual Heat Removal - Insulated | 622 | 554 | 61 | 82 | 563 | 880 | - | 772 | 3,535 | 3,535 | - | - | 3,367 | 2,607 | - | - | - | 303,087 | 10,340 | - |
| 2a.1.5.48 | Rx Core Isolation Cooling | - | 49 | 2 | 4 | 43 | 26 | - | 26 | 150 | 150 | - | - | 259 | 76 | - | - | - | 15,396 | 691 | - |
| 2a.1.5.49 | Rx Core Isolation Cooling - Insulated | - | 107 | 5 | 7 | 48 | 67 | - | 52 | 287 | 287 | - | - | 288 | 198 | - | - | - | 24,419 | 1,479 | - |
| 2a.1.5.50 | Rx Recirculation | 56 | 58 | 6 | 4 | 7 | 65 | - | 61 | 258 | 258 | - | - | 43 | 190 | - | - | - | 14,095 | 1,580 | - |
| 2a.1.5.51 | Snubbers | - | 169 | 2 | 5 | 63 | 30 | - | 60 | 331 | 331 | - | - | 377 | 90 | - | - | - | 21,009 | 2,548 | - |
| 2a.1.5.52 | Standby Liquid Control - Insul - RCA | - | 4 | 0 | 0 | 4 | - | - | 2 | 9 | 9 | - | - | 22 | - | - | - | - | 904 | 48 | - |
| 2a.1.5.53 | Standby Liquid Control - RCA | - | 26 | 1 | 2 | 41 | - | - | 13 | 83 | 83 | - | - | 245 | - | - | - | - | 9,969 | 341 | - |
| 2a.1.5.54 | Stator Cooling - RCA | - | 7 | 0 | 1 | 21 | - | - | 5 | 35 | 35 | - | - | 126 | - | - | - | - | 5,135 | 98 | - |
| 2a.1.5.55 | Traversing Incore Probe | 0 | 4 | 0 | 0 | 0 | 2 | - | 1 | 7 | 7 | - | - | 1 | 5 | - | - | - | 386 | 51 | - |
| 2a.1.5 | Totals | 1,040 | 8,221 | 924 | 1,572 | 16,339 | 11,425 | - | 8,209 | 47,730 | 47,706 | - | 24 | 97,654 | 33,808 | - | - | - | 6,125,515 | 119,943 | - |
| 2a.1.6 | Scaffolding in support of decommissioning | - | 2,265 | 22 | 12 | 191 | 31 | - | 607 | 3,127 | 3,127 | - | - | 1,030 | 91 | - | - | - | 52,111 | 22,564 | - |
| 2a.1 | Subtotal Period 2a Activity Costs | 1,742 | 29,721 | 18,645 | 6,398 | 25,937 | 50,042 | 728 | 47,148 | 180,360 | 180,336 | - | 24 | 141,010 | 59,545 | 1,761 | 898 | - | 10,458,540 | 253,640 | 2,758 |
| Period 2a Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 2a.3.1 | Process decommissioning water waste | 85 | - | 57 | 102 | - | 232 | - | 122 | 598 | 598 | - | - | - | 532 | - | - | - | 31,942 | 104 | - |
| 2a.3.2 | Process decommissioning chemical flush waste | 5 | - | 216 | 702 | - | 1,619 | - | 534 | 3,077 | 3,077 | - | - | - | 2,093 | - | - | - | 223,008 | 392 | - |
| 2a.3.3 | Small tool allowance | - | 324 | - | - | - | - | - | 49 | 373 | 336 | - | 37 | - | - | - | - | - | - | - | - |
| 2a.3.4 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 24,119 | 3,618 | 27,737 | - | 27,737 | - | - | - | - | - | - | - | - | - |
| 2a.3.5 | Retention and Severance | - | - | - | - | - | - | 13,127 | 1,969 | 15,097 | 15,097 | - | - | - | - | - | - | - | - | - | - |
| 2a.3.6 | On-site survey and release of 0.0 tons clean metallic waste | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 2a.3 | Subtotal Period 2a Collateral Costs | 91 | 324 | 274 | 804 | - | 1,851 | 37,247 | 6,292 | 46,882 | 19,107 | 27,737 | 37 | - | 2,625 | - | - | - | 254,950 | 495 | - |
| Period 2a Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 2a.4.1 | Decon supplies | 112 | - | - | - | - | - | - | 28 | 140 | 140 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.2 | Insurance | - | - | - | - | - | - | 1,019 | 102 | 1,121 | 1,121 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.3 | Property taxes | - | - | - | - | - | - | 4,377 | 438 | 4,814 | 4,814 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.4 | Health physics supplies | - | 2,356 | - | - | - | - | - | 589 | 2,945 | 2,945 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.5 | Heavy equipment rental | - | 3,627 | - | - | - | - | - | 544 | 4,171 | 4,171 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.6 | Disposal of DAW generated | - | - | 110 | 57 | - | 457 | - | 134 | 758 | 758 | - | - | - | 5,551 | - | - | - | 111,023 | 181 | - |
| 2a.4.7 | Plant energy budget | - | - | - | - | - | - | 2,501 | 375 | 2,876 | 2,876 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.8 | NRC Fees | - | - | - | - | - | - | 856 | 86 | 942 | 942 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.9 | Emergency Planning Fees | - | - | - | - | - | - | 4,115 | 412 | 4,527 | - | 4,527 | - | - | - | - | - | - | - | - | - |
| 2a.4.10 | Fixed Overhead | - | - | - | - | - | - | 3,071 | 461 | 3,532 | 3,532 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.11 | Spent Fuel Pool O&M | - | - | - | - | - | - | 1,224 | 184 | 1,408 | - | 1,408 | - | - | - | - | - | - | - | - | - |
| 2a.4.12 | ISFSI Operating Costs | - | - | - | - | - | - | 162 | 24 | 187 | - | 187 | - | - | - | - | - | - | - | - | - |
| 2a.4.13 | Railroad Track Maintenance | - | - | - | - | - | - | 181 | 27 | 208 | 208 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.14 | Remedial Actions Surveys | - | - | - | - | - | - | 1,624 | 244 | 1,867 | 1,867 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.15 | Security Staff Cost | - | - | - | - | - | - | 22,088 | 3,313 | 25,401 | 25,401 | - | - | - | - | - | - | - | - | - | 325,574 |
| 2a.4.16 | DOC Staff Cost | - | - | - | - | - | - | 21,021 | 3,153 | 24,174 | 24,174 | - | - | - | - | - | - | - | - | - | 229,108 |
| 2a.4.17 | Utility Staff Cost | - | - | - | - | - | - | 27,906 | 4,186 | 32,092 | 32,092 | - | - | - | - | - | - | - | - | - | 426,562 |
| 2a.4 | Subtotal Period 2a Period-Dependent Costs | 112 | 5,982 | 110 | 57 | - | 457 | 90,145 | 14,298 | 111,162 | 105,041 | 6,121 | - | - | 5,551 | - | - | - | 111,023 | 181 | 981,244 |
| 2a.0 | TOTAL PERIOD 2a COST | 1,945 | 36,028 | 19,028 | 7,259 | 25,937 | 52,350 | 128,120 | 67,738 | 338,404 | 304,484 | 33,858 | 62 | 141,010 | 67,722 | 1,761 | 898 | - | 10,824,520 | 254,317 | 984,002 |
| PERIOD 2b - Site Decontamination | | | | | | | | | | | | | | | | | | | | | |
| Period 2b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| Disposal of Plant Systems | | | | | | | | | | | | | | | | | | | | | |
| 2b.1.1.1 | ALARA/Radiological | - | 18 | 0 | 1 | 6 | 3 | - | 6 | 35 | 35 | - | - | 35 | 10 | - | - | - | 2,060 | 277 | - |
| 2b.1.1.2 | Alternate N2 - RCA | - | 16 | 0 | 1 | 16 | - | - | 7 | 40 | 40 | - | - | 93 | - | - | - | - | 3,765 | 185 | - |
| 2b.1.1.3 | Decontamination Projects | - | 1 | 0 | 0 | 0 | 0 | - | 0 | 2 | 2 | - | - | 2 | 0 | - | - | - | 129 | 17 | - |
| 2b.1.1.4 | Electrical - Contaminated | - | 445 | 6 | 24 | 400 | 30 | - | 183 | 1,089 | 1,089 | - | - | 2,389 | 90 | - | - | - | 102,726 | 6,325 | - |
| 2b.1.1.5 | Electrical - Decontaminated | - | 2,698 | 48 | 218 | 3,906 | - | - | 1,298 | 8,167 | 8,167 | - | - | 23,344 | - | - | - | - | 948,013 | 37,107 | - |
| 2b.1.1.6 | Fire - RCA | - | 101 | 1 | 6 | 103 | - | - | 42 | 253 | 253 | - | - | 614 | - | - | - | - | 24,917 | 1,324 | - |
| 2b.1.1.7 | HVAC Ductwork | - | 305 | 7 | 27 | 446 | 34 | - | 156 | 975 | 975 | - | - | 2,665 | 100 | - | - | - | 114,598 | 4,111 | - |
| 2b.1.1.8 | HVAC/Chilled Water - RCA | - | 324 | 6 | 26 | 461 | - | - | 155 | 971 | 971 | - | - | 2,752 | - | - | - | - | 111,779 | 3,985 | - |
| 2b.1.1.9 | Heating & Ventilation | - | 483 | 16 | 61 | 1,007 | 76 | - | 302 | 1,945 | 1,945 | - | - | 6,018 | 227 | - | - | - | 258,789 | 7,101 | - |
| 2b.1.1.10 | Heating Boiler - Insulated - RCA | - | 3 | 0 | 0 | 4 | - | - | 1 | 9 | 9 | - | - | 26 | - | - | - | - | 1,058 | 35 | - |
| 2b.1.1.11 | Liquid Radwaste | 588 | 687 | 48 | 63 | 514 | 586 | - | 703 | 3,188 | 3,188 | - | - | 3,073 | 1,728 | - | - | - | 235,484 | 17,194 | - |
| 2b.1.1.12 | Makeup Demin - RCA | - | 103 | 3 | 14 | 246 | - | - | 65 | 431 | 431 | - | - | 1,471 | - | - | - | - | 59,747 | 1,412 | - |
| 2b.1.1.13 | Non-Essential Diesel Generator - RCA | - | 27 | 3 | 13 | 238 | - | - | 45 | 327 | 327 | - | - | 1,424 | - | - | - | - | 57,832 | 395 | - |
| 2b.1.1.14 | Off Gas Holdup | - | 342 | 21 | 38 | 461 | 214 | - | 216 | 1,291 | 1,291 | - | - | 2,755 | 630 | - | - | - | 152,277 | 4,769 | - |
| 2b.1.1.15 | Primary Containment | - | 455 | 42 | 87 | 1,038 | 507 | - | 414 | 2,543 | 2,543 | - | - | 6,201 | 1,506 | - | - | - | 347,704 | 6,454 | - |

**Monticello Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table F
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---------------------------------------|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| Disposal of Plant Systems (continued) | | | | | | | | | | | | | | | | | | | | | |
| 2b.1.1.16 | Process Radiation Monitors | - | 46 | 2 | 2 | 24 | 18 | - | 20 | 111 | 111 | - | - | 142 | 52 | - | - | - | 9,115 | 649 | - |
| 2b.1.1.17 | Rx Bldg Closed Cng Water - Insul - RCA | - | 114 | 2 | 9 | 163 | - | - | 54 | 343 | 343 | - | - | 977 | - | - | - | - | 39,675 | 1,484 | - |
| 2b.1.1.18 | Rx Bldg Closed Cng Water - RCA | - | 184 | 15 | 66 | 1,187 | - | - | 235 | 1,687 | 1,687 | - | - | 7,093 | - | - | - | - | 288,031 | 2,489 | - |
| 2b.1.1.19 | Rx Component Handling Equip | 27 | 142 | 18 | 27 | 194 | 279 | - | 154 | 840 | 840 | - | - | 1,158 | 829 | - | - | - | 99,730 | 2,462 | - |
| 2b.1.1.20 | Rx Pressure Vessel | 28 | 47 | 6 | 5 | 13 | 78 | - | 48 | 225 | 225 | - | - | 75 | 230 | - | - | - | 17,816 | 1,051 | - |
| 2b.1.1.21 | Rx Water Cleanup | 172 | 265 | 19 | 16 | 22 | 251 | - | 222 | 965 | 965 | - | - | 130 | 737 | - | - | - | 52,670 | 5,736 | - |
| 2b.1.1.22 | Secondary Containment | - | 124 | 7 | 14 | 170 | 86 | - | 81 | 483 | 483 | - | - | 1,017 | 255 | - | - | - | 57,567 | 1,763 | - |
| 2b.1.1.23 | Service & Seal Water - Insulated - RCA | - | 120 | 2 | 11 | 197 | - | - | 62 | 392 | 392 | - | - | 1,180 | - | - | - | - | 47,917 | 1,565 | - |
| 2b.1.1.24 | Service & Seal Water - RCA | - | 159 | 4 | 17 | 303 | - | - | 88 | 570 | 570 | - | - | 1,809 | - | - | - | - | 73,453 | 2,016 | - |
| 2b.1.1.25 | Service Air Blower - RCA | - | 15 | 0 | 2 | 34 | - | - | 9 | 62 | 62 | - | - | 206 | - | - | - | - | 8,364 | 206 | - |
| 2b.1.1.26 | Solid Radwaste | 338 | 494 | 36 | 49 | 399 | 467 | - | 480 | 2,264 | 2,264 | - | - | 2,387 | 1,380 | - | - | - | 185,221 | 10,820 | - |
| 2b.1.1.27 | Structures & Buildings | - | 78 | 2 | 5 | 60 | 29 | - | 37 | 210 | 210 | - | - | 357 | 85 | - | - | - | 19,933 | 1,128 | - |
| 2b.1.1.28 | Wells & Domestic Water | - | 10 | - | - | - | - | - | 1 | 11 | - | - | 11 | - | - | - | - | - | - | 144 | - |
| 2b.1.1.29 | Wells & Domestic Water - RCA | - | 52 | 1 | 3 | 57 | - | - | 22 | 136 | 136 | - | - | 342 | - | - | - | - | 13,874 | 633 | - |
| 2b.1.1 | Totals | 1,153 | 7,860 | 315 | 804 | 11,668 | 2,657 | - | 5,107 | 29,563 | 29,552 | - | 11 | 69,735 | 7,859 | - | - | - | 3,334,244 | 122,835 | - |
| 2b.1.2 | Scaffolding in support of decommissioning | - | 2,831 | 28 | 16 | 239 | 38 | - | 758 | 3,909 | 3,909 | - | - | 1,287 | 114 | - | - | - | 65,139 | 28,205 | - |
| Decontamination of Site Buildings | | | | | | | | | | | | | | | | | | | | | |
| 2b.1.3.1 | Reactor Building | 5,202 | 2,903 | 178 | 516 | 8,044 | 1,181 | - | 4,924 | 22,948 | 22,948 | - | - | 48,077 | 7,014 | - | - | - | 2,317,670 | 112,518 | - |
| 2b.1.3.2 | Admin | 106 | 6 | 0 | 3 | - | 15 | - | 59 | 189 | 189 | - | - | - | 145 | - | - | - | 6,840 | 1,600 | - |
| 2b.1.3.3 | HPCI Room | 29 | 28 | 1 | 3 | 20 | 14 | - | 29 | 123 | 123 | - | - | 118 | 125 | - | - | - | 10,759 | 789 | - |
| 2b.1.3.4 | Hot Shop | 17 | 4 | 0 | 2 | - | 11 | - | 12 | 46 | 46 | - | - | - | 103 | - | - | - | 4,860 | 286 | - |
| 2b.1.3.5 | LLRW Storage & Shipping | 58 | 24 | 2 | 8 | 5 | 45 | - | 48 | 191 | 191 | - | - | 31 | 433 | - | - | - | 21,708 | 1,127 | - |
| 2b.1.3.6 | Offgas Stack | 372 | 269 | 7 | 23 | 225 | 82 | - | 312 | 1,289 | 1,289 | - | - | 1,343 | 669 | - | - | - | 87,045 | 8,860 | - |
| 2b.1.3.7 | Offgas Storage & Compressor | 41 | 17 | 1 | 6 | 4 | 33 | - | 34 | 136 | 136 | - | - | 25 | 316 | - | - | - | 15,948 | 785 | - |
| 2b.1.3.8 | Radwaste | 121 | 61 | 3 | 17 | 29 | 96 | - | 107 | 435 | 435 | - | - | 172 | 910 | - | - | - | 49,943 | 2,503 | - |
| 2b.1.3.9 | Radwaste Material Storage Warehouse | 64 | 24 | 2 | 9 | - | 52 | - | 52 | 202 | 202 | - | - | - | 495 | - | - | - | 23,400 | 1,197 | - |
| 2b.1.3.10 | Recombiner | 27 | 25 | 1 | 5 | 33 | 24 | - | 32 | 148 | 148 | - | - | 199 | 216 | - | - | - | 18,405 | 695 | - |
| 2b.1.3.11 | Turbine | 705 | 353 | 21 | 104 | 215 | 564 | - | 632 | 2,594 | 2,594 | - | - | 1,283 | 5,299 | - | - | - | 303,150 | 14,443 | - |
| 2b.1.3.12 | Turbine Building Addition | 58 | 21 | 1 | 8 | - | 45 | - | 47 | 181 | 181 | - | - | - | 434 | - | - | - | 20,478 | 1,087 | - |
| 2b.1.3 | Totals | 6,799 | 3,736 | 218 | 704 | 8,574 | 2,164 | - | 6,288 | 28,483 | 28,483 | - | - | 51,247 | 16,159 | - | - | - | 2,880,206 | 145,889 | - |
| 2b.1.4 | Prepare/submit License Termination Plan | - | - | - | - | - | - | 526 | 79 | 605 | 605 | - | - | - | - | - | - | - | - | - | 4,096 |
| 2b.1.5 | Receive NRC approval of termination plan | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 2b.1 | Subtotal Period 2b Activity Costs | 7,952 | 14,427 | 560 | 1,524 | 20,481 | 4,859 | 526 | 12,232 | 62,561 | 62,549 | - | 11 | 122,269 | 24,132 | - | - | - | 6,279,589 | 296,929 | 4,096 |
| Period 2b Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 2b.2.1 | Operational Equipment | - | - | 23 | 92 | 1,211 | - | - | 198 | 1,524 | 1,524 | - | - | 11,760 | - | - | - | - | 294,000 | 32 | - |
| 2b.2.2 | Excavation of Underground Services | - | 1,972 | - | - | - | - | 376 | 550 | 2,898 | 2,898 | - | - | - | - | - | - | - | - | 12,493 | - |
| 2b.2.3 | Security Modifications | - | - | - | - | - | - | 8,696 | 1,304 | 10,000 | 10,000 | - | - | - | - | - | - | - | - | - | - |
| 2b.2 | Subtotal Period 2b Additional Costs | - | 1,972 | 23 | 92 | 1,211 | - | 9,072 | 2,052 | 14,422 | 14,422 | - | - | 11,760 | - | - | - | - | 294,000 | 12,525 | - |
| Period 2b Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 2b.3.1 | Process decommissioning water waste | 198 | - | 135 | 240 | - | 546 | - | 285 | 1,404 | 1,404 | - | - | - | 1,253 | - | - | - | 75,186 | 244 | - |
| 2b.3.2 | Process decommissioning chemical flush waste | 1 | - | 43 | 138 | - | 319 | - | 105 | 607 | 607 | - | - | - | 413 | - | - | - | 43,978 | 77 | - |
| 2b.3.3 | Small tool allowance | - | 364 | - | - | - | - | - | 55 | 418 | 418 | - | - | - | - | - | - | - | - | - | - |
| 2b.3.4 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 117,254 | 17,588 | 134,843 | - | 134,843 | - | - | - | - | - | - | - | - | - |
| 2b.3.5 | Retention and Severance | - | - | - | - | - | - | 6,299 | 945 | 7,244 | 7,244 | - | - | - | - | - | - | - | - | - | - |
| 2b.3 | Subtotal Period 2b Collateral Costs | 199 | 364 | 178 | 378 | - | 865 | 123,554 | 18,978 | 144,516 | 9,673 | 134,843 | - | - | 1,666 | - | - | - | 119,165 | 322 | - |
| Period 2b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 2b.4.1 | Decon supplies | 1,440 | - | - | - | - | - | - | 360 | 1,799 | 1,799 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.2 | Insurance | - | - | - | - | - | - | 742 | 74 | 816 | 816 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.3 | Property taxes | - | - | - | - | - | - | 2,703 | 270 | 2,974 | 2,974 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.4 | Health physics supplies | - | 2,376 | - | - | - | - | - | 594 | 2,970 | 2,970 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.5 | Heavy equipment rental | - | 2,711 | - | - | - | - | - | 407 | 3,117 | 3,117 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.6 | Disposal of DAW generated | - | - | 101 | 52 | - | 419 | - | 123 | 694 | 694 | - | - | - | 5,084 | - | - | - | 101,679 | 166 | - |
| 2b.4.7 | Plant energy budget | - | - | - | - | - | - | 1,437 | 216 | 1,653 | 1,653 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.8 | NRC Fees | - | - | - | - | - | - | 623 | 62 | 685 | 685 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.9 | Emergency Planning Fees | - | - | - | - | - | - | 2,995 | 299 | 3,294 | - | 3,294 | - | - | - | - | - | - | - | - | - |
| 2b.4.10 | Fixed Overhead | - | - | - | - | - | - | 2,235 | 335 | 2,570 | 2,570 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.11 | Spent Fuel Pool O&M | - | - | - | - | - | - | 891 | 134 | 1,024 | - | 1,024 | - | - | - | - | - | - | - | - | - |
| 2b.4.12 | Liquid Radwaste Processing Equipment/Services | - | - | - | - | - | - | 224 | 34 | 258 | 258 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.13 | ISFSI Operating Costs | - | - | - | - | - | - | 118 | 18 | 136 | - | 136 | - | - | - | - | - | - | - | - | - |
| 2b.4.14 | Railroad Track Maintenance | - | - | - | - | - | - | 458 | 69 | 527 | 527 | - | - | - | - | - | - | - | - | - | - |

**Monticello Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table F
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|---------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| Period 2b Period-Dependent Costs (continued) | | | | | | | | | | | | | | | | | | | | | | |
| 2b.4.15 | Remedial Actions Surveys | - | - | - | - | - | - | 1,182 | 177 | 1,359 | 1,359 | - | - | - | - | - | - | - | - | - | - | |
| 2b.4.16 | Security Staff Cost | - | - | - | - | - | - | 15,718 | 2,358 | 18,076 | 18,076 | - | - | - | - | - | - | - | - | - | 236,949 | |
| 2b.4.17 | DOC Staff Cost | - | - | - | - | - | - | 14,772 | 2,216 | 16,988 | 16,988 | - | - | - | - | - | - | - | - | - | 160,160 | |
| 2b.4.18 | Utility Staff Cost | - | - | - | - | - | - | 19,442 | 2,916 | 22,358 | 22,358 | - | - | - | - | - | - | - | - | - | 297,283 | |
| 2b.4 | Subtotal Period 2b Period-Dependent Costs | 1,440 | 5,087 | 101 | 52 | - | 419 | 63,540 | 10,661 | 81,298 | 76,844 | 4,455 | - | - | 5,084 | - | - | - | - | 101,679 | 166 | 694,392 |
| 2b.0 | TOTAL PERIOD 2b COST | 9,591 | 21,850 | 861 | 2,046 | 21,692 | 6,143 | 196,692 | 43,923 | 302,797 | 163,488 | 139,297 | 11 | 134,029 | 30,882 | - | - | - | - | 6,794,433 | 309,941 | 698,488 |
| PERIOD 2d - Decontamination Following Wet Fuel Storage | | | | | | | | | | | | | | | | | | | | | | |
| Period 2d Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| 2d.1.1 | Remove spent fuel racks | 654 | 58 | 103 | 149 | - | 2,572 | - | 1,017 | 4,553 | 4,553 | - | - | - | 7,653 | - | - | - | - | 486,170 | 906 | - |
| Disposal of Plant Systems | | | | | | | | | | | | | | | | | | | | | | |
| 2d.1.2.1 | Cranes/Heavy Loads/Rigging - RCA | - | 3 | 0 | 1 | 17 | - | - | 4 | 25 | 25 | - | - | 103 | - | - | - | - | - | 4,184 | 48 | - |
| 2d.1.2.2 | Electrical - Contaminated Fuel Pool | - | 47 | 1 | 2 | 40 | 3 | - | 19 | 112 | 112 | - | - | 240 | 9 | - | - | - | - | 10,334 | 665 | - |
| 2d.1.2.3 | Electrical - Decontam. Fuel Pool Area | - | 297 | 5 | 23 | 411 | - | - | 140 | 876 | 876 | - | - | 2,457 | - | - | - | - | - | 99,783 | 4,090 | - |
| 2d.1.2.4 | Fire - RCA - Fuel Pool Area | - | 11 | 0 | 1 | 10 | - | - | 4 | 26 | 26 | - | - | 62 | - | - | - | - | - | 2,499 | 143 | - |
| 2d.1.2.5 | Fuel Pool Cooling & Cleanup | 246 | 428 | 34 | 37 | 197 | 455 | - | 382 | 1,781 | 1,781 | - | - | 1,179 | 1,341 | - | - | - | - | 133,939 | 8,380 | - |
| 2d.1.2.6 | Fuel Pool Cooling & Cleanup - Insulated | 27 | 41 | 3 | 3 | 11 | 40 | - | 36 | 161 | 161 | - | - | 67 | 117 | - | - | - | - | 10,220 | 848 | - |
| 2d.1.2.7 | HVAC Ductwork - Fuel Pool Area | - | 34 | 1 | 3 | 50 | 4 | - | 17 | 108 | 108 | - | - | 296 | 11 | - | - | - | - | 12,733 | 457 | - |
| 2d.1.2.8 | HVAC/Chilled Water - RCA Fuel Pool Area | - | 33 | 0 | 2 | 37 | - | - | 14 | 87 | 87 | - | - | 223 | - | - | - | - | - | 9,072 | 397 | - |
| 2d.1.2.9 | Instrument & Service Air-RCA-Fuel Pool | - | 29 | 1 | 2 | 45 | - | - | 14 | 91 | 91 | - | - | 267 | - | - | - | - | - | 10,841 | 357 | - |
| 2d.1.2 | Totals | 273 | 924 | 45 | 75 | 819 | 502 | - | 631 | 3,268 | 3,268 | - | - | 4,894 | 1,479 | - | - | - | - | 293,606 | 15,385 | - |
| Decontamination of Site Buildings | | | | | | | | | | | | | | | | | | | | | | |
| 2d.1.3.1 | Reactor (Post Fuel) | 946 | 2,599 | 172 | 913 | 329 | 10,216 | - | 3,880 | 19,056 | 19,056 | - | - | 1,969 | 62,698 | - | - | - | - | 2,732,406 | 45,703 | - |
| 2d.1.3 | Totals | 946 | 2,599 | 172 | 913 | 329 | 10,216 | - | 3,880 | 19,056 | 19,056 | - | - | 1,969 | 62,698 | - | - | - | - | 2,732,406 | 45,703 | - |
| 2d.1.4 | Scaffolding in support of decommissioning | - | 566 | 6 | 3 | 48 | 8 | - | 152 | 782 | 782 | - | - | 257 | 23 | - | - | - | - | 13,028 | 5,641 | - |
| 2d.1 | Subtotal Period 2d Activity Costs | 1,872 | 4,147 | 326 | 1,139 | 1,196 | 13,298 | - | 5,680 | 27,659 | 27,659 | - | - | 7,120 | 71,852 | - | - | - | - | 3,525,210 | 67,635 | - |
| Period 2d Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 2d.2.1 | License Termination Survey Planning | - | - | - | - | - | - | 1,458 | 437 | 1,896 | 1,896 | - | - | - | - | - | - | - | - | - | - | 12,480 |
| 2d.2 | Subtotal Period 2d Additional Costs | - | - | - | - | - | - | 1,458 | 437 | 1,896 | 1,896 | - | - | - | - | - | - | - | - | - | - | 12,480 |
| Period 2d Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 2d.3.1 | Process decommissioning water waste | 79 | - | 54 | 96 | - | 220 | - | 114 | 563 | 563 | - | - | - | 504 | - | - | - | - | 30,239 | 98 | - |
| 2d.3.2 | Process decommissioning chemical flush waste | 1 | - | 26 | 84 | - | 193 | - | 64 | 366 | 366 | - | - | - | 249 | - | - | - | - | 26,553 | 47 | - |
| 2d.3.3 | Small tool allowance | - | 91 | - | - | - | - | - | 14 | 105 | 105 | - | - | - | - | - | - | - | - | - | - | - |
| 2d.3.4 | Decommissioning Equipment Disposition | - | - | 130 | 82 | 1,112 | 178 | - | 237 | 1,739 | 1,739 | - | - | 6,000 | 529 | - | - | - | - | 303,608 | 147 | - |
| 2d.3.5 | Spent Fuel Capital and Transfer | - | - | - | - | - | 27 | - | 4 | 32 | - | 32 | - | - | - | - | - | - | - | - | - | - |
| 2d.3 | Subtotal Period 2d Collateral Costs | 80 | 91 | 210 | 262 | 1,112 | 590 | 27 | 432 | 2,805 | 2,773 | 32 | - | 6,000 | 1,282 | - | - | - | - | 360,400 | 292 | - |
| Period 2d Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 2d.4.1 | Decon supplies | 244 | - | - | - | - | - | - | 61 | 305 | 305 | - | - | - | - | - | - | - | - | - | - | - |
| 2d.4.2 | Insurance | - | - | - | - | - | - | 530 | 53 | 583 | 583 | - | - | - | - | - | - | - | - | - | - | - |
| 2d.4.3 | Property taxes | - | - | - | - | - | - | 1,664 | 166 | 1,830 | 1,830 | - | - | - | - | - | - | - | - | - | - | - |
| 2d.4.4 | Health physics supplies | - | 806 | - | - | - | - | - | 202 | 1,008 | 1,008 | - | - | - | - | - | - | - | - | - | - | - |
| 2d.4.5 | Heavy equipment rental | - | 1,936 | - | - | - | - | - | 290 | 2,227 | 2,227 | - | - | - | - | - | - | - | - | - | - | - |
| 2d.4.6 | Disposal of DAW generated | - | - | 40 | 21 | - | 167 | - | 49 | 277 | 277 | - | - | - | 2,030 | - | - | - | - | 40,600 | 66 | - |
| 2d.4.7 | Plant energy budget | - | - | - | - | - | - | 547 | 82 | 630 | 630 | - | - | - | - | - | - | - | - | - | - | - |
| 2d.4.8 | NRC Fees | - | - | - | - | - | - | 424 | 42 | 466 | 466 | - | - | - | - | - | - | - | - | - | - | - |
| 2d.4.9 | Emergency Planning Fees | - | - | - | - | - | - | 112 | 11 | 123 | - | 123 | - | - | - | - | - | - | - | - | - | - |
| 2d.4.10 | Fixed Overhead | - | - | - | - | - | - | 1,597 | 239 | 1,836 | 1,836 | - | - | - | - | - | - | - | - | - | - | - |
| 2d.4.11 | Liquid Radwaste Processing Equipment/Services | - | - | - | - | - | - | 320 | 48 | 368 | 368 | - | - | - | - | - | - | - | - | - | - | - |
| 2d.4.12 | ISFSI Operating Costs | - | - | - | - | - | - | 84 | 13 | 97 | - | 97 | - | - | - | - | - | - | - | - | - | - |
| 2d.4.13 | Railroad Track Maintenance | - | - | - | - | - | - | 94 | 14 | 108 | 108 | - | - | - | - | - | - | - | - | - | - | - |
| 2d.4.14 | Remedial Actions Surveys | - | - | - | - | - | - | 844 | 127 | 971 | 971 | - | - | - | - | - | - | - | - | - | - | - |
| 2d.4.15 | Security Staff Cost | - | - | - | - | - | - | 10,999 | 1,650 | 12,649 | 8,918 | 3,732 | - | - | - | - | - | - | - | - | - | 162,981 |
| 2d.4.16 | DOC Staff Cost | - | - | - | - | - | - | 7,311 | 1,097 | 8,408 | 8,408 | - | - | - | - | - | - | - | - | - | - | 78,356 |
| 2d.4.17 | Utility Staff Cost | - | - | - | - | - | - | 10,052 | 1,508 | 11,560 | 10,670 | 890 | - | - | - | - | - | - | - | - | - | 149,660 |
| 2d.4 | Subtotal Period 2d Period-Dependent Costs | 244 | 2,743 | 40 | 21 | - | 167 | 34,579 | 5,652 | 43,446 | 38,604 | 4,842 | - | 2,030 | - | - | - | - | - | 40,600 | 66 | 390,997 |
| 2d.0 | TOTAL PERIOD 2d COST | 2,196 | 6,981 | 576 | 1,422 | 2,308 | 14,055 | 36,065 | 12,202 | 75,806 | 70,932 | 4,873 | - | 13,120 | 75,164 | - | - | - | - | 3,926,210 | 67,993 | 403,477 |

**Monticello Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table F
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|---|---------------|---------------|-----------------|-----------------|---------------------------|---------------------|----------------|-------------------|----------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| PERIOD 2f - License Termination | | | | | | | | | | | | | | | | | | | | | |
| Period 2f Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| 2f.1.1 | ORISE confirmatory survey | - | - | - | - | - | - | 166 | 50 | 216 | 216 | - | - | - | - | - | - | - | - | - | - |
| 2f.1.2 | Terminate license | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 2f.1 | Subtotal Period 2f Activity Costs | - | - | - | - | - | - | 166 | 50 | 216 | 216 | - | - | - | - | - | - | - | - | - | - |
| Period 2f Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 2f.2.1 | License Termination Survey | - | - | - | - | - | - | 6,920 | 2,076 | 8,995 | 8,995 | - | - | - | - | - | - | - | - | 95,048 | 6,240 |
| 2f.2 | Subtotal Period 2f Additional Costs | - | - | - | - | - | - | 6,920 | 2,076 | 8,995 | 8,995 | - | - | - | - | - | - | - | - | 95,048 | 6,240 |
| Period 2f Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 2f.3.1 | DOC staff relocation expenses | - | - | - | - | - | - | 1,264 | 190 | 1,454 | 1,454 | - | - | - | - | - | - | - | - | - | - |
| 2f.3.2 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 47 | 7 | 54 | - | 54 | - | - | - | - | - | - | - | - | - |
| 2f.3 | Subtotal Period 2f Collateral Costs | - | - | - | - | - | - | 1,311 | 197 | 1,508 | 1,454 | 54 | - | - | - | - | - | - | - | - | - |
| Period 2f Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 2f.4.1 | Insurance | - | - | - | - | - | - | 530 | 53 | 583 | 583 | - | - | - | - | - | - | - | - | - | - |
| 2f.4.2 | Property taxes | - | - | - | - | - | - | 1,470 | 147 | 1,617 | 1,617 | - | - | - | - | - | - | - | - | - | - |
| 2f.4.3 | Health physics supplies | - | 708 | - | - | - | - | - | 177 | 884 | 884 | - | - | - | - | - | - | - | - | - | - |
| 2f.4.4 | Disposal of DAW generated | - | - | 7 | 4 | - | 29 | - | 9 | 48 | 48 | - | - | 355 | - | - | - | - | 7,097 | 12 | - |
| 2f.4.5 | Plant energy budget | - | - | - | - | - | - | 274 | 41 | 315 | 315 | - | - | - | - | - | - | - | - | - | - |
| 2f.4.6 | NRC Fees | - | - | - | - | - | - | 426 | 43 | 468 | 468 | - | - | - | - | - | - | - | - | - | - |
| 2f.4.7 | Emergency Planning Fees | - | - | - | - | - | - | 112 | 11 | 123 | - | 123 | - | - | - | - | - | - | - | - | - |
| 2f.4.8 | Fixed Overhead | - | - | - | - | - | - | 1,597 | 239 | 1,836 | 1,836 | - | - | - | - | - | - | - | - | - | - |
| 2f.4.9 | ISFSI Operating Costs | - | - | - | - | - | - | 84 | 13 | 97 | - | 97 | - | - | - | - | - | - | - | - | - |
| 2f.4.10 | Railroad Track Maintenance | - | - | - | - | - | - | 94 | 14 | 108 | 108 | - | - | - | - | - | - | - | - | - | - |
| 2f.4.11 | Security Staff Cost | - | - | - | - | - | - | 10,999 | 1,650 | 12,649 | 8,918 | 3,732 | - | - | - | - | - | - | - | - | 162,981 |
| 2f.4.12 | DOC Staff Cost | - | - | - | - | - | - | 5,393 | 809 | 6,201 | 6,201 | - | - | - | - | - | - | - | - | - | 57,200 |
| 2f.4.13 | Utility Staff Cost | - | - | - | - | - | - | 5,762 | 864 | 6,626 | 5,738 | 888 | - | - | - | - | - | - | - | - | 80,707 |
| 2f.4 | Subtotal Period 2f Period-Dependent Costs | - | 708 | 7 | 4 | - | 29 | 26,740 | 4,070 | 31,557 | 26,718 | 4,839 | - | - | 355 | - | - | - | 7,097 | 12 | 300,888 |
| 2f.0 | TOTAL PERIOD 2f COST | - | 708 | 7 | 4 | - | 29 | 35,137 | 6,392 | 42,276 | 37,382 | 4,893 | - | - | 355 | - | - | - | 7,097 | 95,059 | 307,128 |
| PERIOD 2 TOTALS | | 13,731 | 65,566 | 20,473 | 10,731 | 49,937 | 72,577 | 396,013 | 130,255 | 759,282 | 576,287 | 182,922 | 73 | 288,160 | 174,123 | 1,761 | 898 | - | 21,552,260 | 727,310 | 2,393,096 |
| PERIOD 3b - Site Restoration | | | | | | | | | | | | | | | | | | | | | |
| Period 3b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| Demolition of Remaining Site Buildings | | | | | | | | | | | | | | | | | | | | | |
| 3b.1.1.1 | Reactor Building | - | 1,971 | - | - | - | - | - | 296 | 2,267 | - | - | 2,267 | - | - | - | - | - | - | 13,911 | - |
| 3b.1.1.2 | Condensate Tanks Foundation | - | 10 | - | - | - | - | - | 1 | 11 | - | - | 11 | - | - | - | - | - | - | 50 | - |
| 3b.1.1.3 | Discharge Retention Basin | - | 4 | - | - | - | - | - | 1 | 5 | - | - | 5 | - | - | - | - | - | - | 25 | - |
| 3b.1.1.4 | HPCI Room | - | 19 | - | - | - | - | - | 3 | 22 | - | - | 22 | - | - | - | - | - | - | 97 | - |
| 3b.1.1.5 | Hot Shop | - | 16 | - | - | - | - | - | 2 | 19 | - | - | 19 | - | - | - | - | - | - | 177 | - |
| 3b.1.1.6 | Hydrogen & Oxygen Storage | - | 2 | - | - | - | - | - | 0 | 2 | - | - | 2 | - | - | - | - | - | - | 19 | - |
| 3b.1.1.7 | LLRW Storage & Shipping | - | 83 | - | - | - | - | - | 12 | 95 | - | - | 95 | - | - | - | - | - | - | 662 | - |
| 3b.1.1.8 | MSIV | - | 4 | - | - | - | - | - | 1 | 4 | - | - | 4 | - | - | - | - | - | - | 42 | - |
| 3b.1.1.9 | Misc Structures 2017 | - | 1,410 | - | - | - | - | - | 212 | 1,622 | - | - | 1,622 | - | - | - | - | - | - | 13,042 | - |
| 3b.1.1.10 | Offgas Stack | - | 108 | - | - | - | - | - | 16 | 124 | - | - | 124 | - | - | - | - | - | - | 544 | - |
| 3b.1.1.11 | Offgas Storage & Compressor | - | 39 | - | - | - | - | - | 6 | 45 | - | - | 45 | - | - | - | - | - | - | 199 | - |
| 3b.1.1.12 | Radwaste | - | 228 | - | - | - | - | - | 34 | 262 | - | - | 262 | - | - | - | - | - | - | 1,220 | - |
| 3b.1.1.13 | Recombiner | - | 128 | - | - | - | - | - | 19 | 147 | - | - | 147 | - | - | - | - | - | - | 713 | - |
| 3b.1.1.14 | Security Barrier | - | 186 | - | - | - | - | - | 28 | 214 | - | - | 214 | - | - | - | - | - | - | 933 | - |
| 3b.1.1.15 | Structures Greater than 3' Below Grade | - | 2,461 | - | - | - | - | - | 369 | 2,830 | - | - | 2,830 | - | - | - | - | - | - | 12,649 | - |
| 3b.1.1.16 | Tank Farm | - | 4 | - | - | - | - | - | 1 | 5 | - | - | 5 | - | - | - | - | - | - | 21 | - |
| 3b.1.1.17 | Turbine | - | 1,259 | - | - | - | - | - | 189 | 1,448 | - | - | 1,448 | - | - | - | - | - | - | 13,036 | - |
| 3b.1.1.18 | Turbine Building Addition | - | 55 | - | - | - | - | - | 8 | 63 | - | - | 63 | - | - | - | - | - | - | 618 | - |
| 3b.1.1.19 | Turbine Pedestal | - | 182 | - | - | - | - | - | 27 | 209 | - | - | 209 | - | - | - | - | - | - | 926 | - |
| 3b.1.1 | Totals | - | 8,169 | - | - | - | - | - | 1,225 | 9,394 | - | - | 9,394 | - | - | - | - | - | - | 58,885 | - |
| Site Closeout Activities | | | | | | | | | | | | | | | | | | | | | |
| 3b.1.2 | Grade & landscape site | - | 896 | - | - | - | - | - | 134 | 1,031 | - | - | 1,031 | - | - | - | - | - | - | 1,841 | - |
| 3b.1.3 | Final report to NRC | - | - | - | - | - | - | 200 | 30 | 231 | 231 | - | - | - | - | - | - | - | - | - | 1,560 |
| 3b.1 | Subtotal Period 3b Activity Costs | - | 9,065 | - | - | - | - | 200 | 1,390 | 10,655 | 231 | - | 10,425 | - | - | - | - | - | - | 60,726 | 1,560 |

**Monticello Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table F
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| Period 3b Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3b.2.1 | Clean Concrete Disposal | - | 3,322 | - | - | - | - | 13 | 500 | 3,835 | - | - | 3,835 | - | - | - | - | - | - | - | 12 | - |
| 3b.2.2 | Intake Structure Cofferdam | - | 335 | - | - | - | - | - | 50 | 385 | - | - | 385 | - | - | - | - | - | - | - | 2,584 | - |
| 3b.2.3 | Construction Debris | - | - | - | - | - | - | 1,170 | 176 | 1,346 | - | - | 1,346 | - | - | - | - | - | - | - | - | - |
| 3b.2.4 | Backfill | - | 5,583 | - | - | - | - | - | 837 | 6,421 | - | - | 6,421 | - | - | - | - | - | - | - | 5,422 | - |
| 3b.2.5 | Discharge Structure Cofferdam | - | 442 | - | - | - | - | - | 66 | 508 | - | - | 508 | - | - | - | - | - | - | - | 3,552 | - |
| 3b.2.6 | Disposition of Original MPC Canisters | - | 55 | 185 | 954 | - | 5,641 | - | 1,709 | 8,544 | 8,544 | - | - | - | 21,097 | - | - | - | - | 2,505,700 | 337 | - |
| 3b.2 | Subtotal Period 3b Additional Costs | - | 9,737 | 185 | 954 | - | 5,641 | 1,183 | 3,339 | 21,039 | 8,544 | - | 12,495 | - | 21,097 | - | - | - | - | 2,505,700 | 11,907 | - |
| Period 3b Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3b.3.1 | Small tool allowance | - | 111 | - | - | - | - | - | 17 | 127 | - | - | 127 | - | - | - | - | - | - | - | - | - |
| 3b.3.2 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 108 | 16 | 125 | - | 125 | - | - | - | - | - | - | - | - | - | - |
| 3b.3 | Subtotal Period 3b Collateral Costs | - | 111 | - | - | - | - | 108 | 33 | 252 | - | 125 | 127 | - | - | - | - | - | - | - | - | - |
| Period 3b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3b.4.1 | Insurance | - | - | - | - | - | - | 1,220 | 122 | 1,342 | 1,342 | - | - | - | - | - | - | - | - | - | - | - |
| 3b.4.2 | Property taxes | - | - | - | - | - | - | 2,540 | 254 | 2,794 | - | 2,794 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.3 | Heavy equipment rental | - | 5,842 | - | - | - | - | - | 876 | 6,719 | - | - | 6,719 | - | - | - | - | - | - | - | - | - |
| 3b.4.4 | Plant energy budget | - | - | - | - | - | - | 315 | 47 | 362 | - | 362 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.5 | NRC ISFSI Fees | - | - | - | - | - | - | 356 | 36 | 391 | - | 391 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.6 | Emergency Planning Fees | - | - | - | - | - | - | 257 | 26 | 283 | - | 283 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.7 | Fixed Overhead | - | - | - | - | - | - | 1,122 | 168 | 1,290 | 429 | 860 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.8 | ISFSI Operating Costs | - | - | - | - | - | - | 194 | 29 | 223 | - | 223 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.9 | Railroad Track Maintenance | - | - | - | - | - | - | 543 | 81 | 624 | 249 | 375 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.10 | Security Staff Cost | - | - | - | - | - | - | 25,319 | 3,798 | 29,117 | 0 | 8,589 | 20,527 | - | - | - | - | - | - | - | - | 375,152 |
| 3b.4.11 | DOC Staff Cost | - | - | - | - | - | - | 11,729 | 1,759 | 13,489 | - | - | 13,489 | - | - | - | - | - | - | - | - | 122,646 |
| 3b.4.12 | Utility Staff Cost | - | - | - | - | - | - | 7,148 | 1,072 | 8,220 | - | 2,129 | 6,091 | - | - | - | - | - | - | - | - | 101,904 |
| 3b.4 | Subtotal Period 3b Period-Dependent Costs | - | 5,842 | - | - | - | - | 50,742 | 8,269 | 64,854 | 2,020 | 16,007 | 46,826 | - | - | - | - | - | - | - | - | 599,702 |
| 3b.0 | TOTAL PERIOD 3b COST | - | 24,755 | 185 | 954 | - | 5,641 | 52,234 | 13,030 | 96,800 | 10,795 | 16,132 | 69,873 | - | 21,097 | - | - | - | - | 2,505,700 | 72,633 | 601,262 |
| PERIOD 3c - Fuel Storage Operations/Shipping | | | | | | | | | | | | | | | | | | | | | | |
| Period 3c Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Period 3c Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3c.3.1 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 1,452,427 | 217,864 | 1,670,291 | - | 1,670,291 | - | - | - | - | - | - | - | - | - | - |
| 3c.3 | Subtotal Period 3c Collateral Costs | - | - | - | - | - | - | 1,452,427 | 217,864 | 1,670,291 | - | 1,670,291 | - | - | - | - | - | - | - | - | - | - |
| Period 3c Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3c.4.1 | Insurance | - | - | - | - | - | - | 135,860 | 13,586 | 149,445 | - | 149,445 | - | - | - | - | - | - | - | - | - | - |
| 3c.4.2 | Property taxes | - | - | - | - | - | - | 175,431 | 17,543 | 192,974 | - | 192,974 | - | - | - | - | - | - | - | - | - | - |
| 3c.4.4 | NRC ISFSI Fees | - | - | - | - | - | - | 41,099 | 4,110 | 45,209 | - | 45,209 | - | - | - | - | - | - | - | - | - | - |
| 3c.4.5 | Emergency Planning Fees | - | - | - | - | - | - | 28,639 | 2,864 | 31,503 | - | 31,503 | - | - | - | - | - | - | - | - | - | - |
| 3c.4.6 | Fixed Overhead | - | - | - | - | - | - | 41,607 | 6,241 | 47,848 | - | 47,848 | - | - | - | - | - | - | - | - | - | - |
| 3c.4.7 | ISFSI Operating Costs | - | - | - | - | - | - | 21,621 | 3,243 | 24,864 | - | 24,864 | - | - | - | - | - | - | - | - | - | - |
| 3c.4.8 | Railroad Track Maintenance | - | - | - | - | - | - | 24,154 | 3,623 | 27,777 | - | 27,777 | - | - | - | - | - | - | - | - | - | - |
| 3c.4.9 | Security Staff Cost | - | - | - | - | - | - | 830,756 | 124,613 | 955,369 | - | 955,369 | - | - | - | - | - | - | - | - | - | 10,446,330 |
| 3c.4.10 | DOC Staff Cost | - | - | - | - | - | - | 59,217 | 8,883 | 68,100 | - | 68,100 | - | - | - | - | - | - | - | - | - | 401,782 |
| 3c.4.11 | Utility Staff Cost | - | - | - | - | - | - | 369,061 | 55,359 | 424,420 | - | 424,420 | - | - | - | - | - | - | - | - | - | 5,323,611 |
| 3c.4 | Subtotal Period 3c Period-Dependent Costs | - | - | - | - | - | - | 1,727,443 | 240,065 | 1,967,509 | - | 1,967,509 | - | - | - | - | - | - | - | - | - | 16,171,720 |
| 3c.0 | TOTAL PERIOD 3c COST | - | - | - | - | - | - | 3,179,870 | 457,929 | 3,637,800 | - | 3,637,800 | - | - | - | - | - | - | - | - | - | 16,171,720 |
| PERIOD 3d - GTCC shipping | | | | | | | | | | | | | | | | | | | | | | |
| Period 3d Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Nuclear Steam Supply System Removal | | | | | | | | | | | | | | | | | | | | | | |
| 3d.1.1.1 | Vessel & Internals GTCC Disposal | - | - | 1,083 | - | - | 4,313 | - | 918 | 6,314 | 6,314 | - | - | - | - | - | - | - | 1,160 | 225,765 | - | - |
| 3d.1.1 | Totals | - | - | 1,083 | - | - | 4,313 | - | 918 | 6,314 | 6,314 | - | - | - | - | - | - | - | 1,160 | 225,765 | - | - |
| 3d.1 | Subtotal Period 3d Activity Costs | - | - | 1,083 | - | - | 4,313 | - | 918 | 6,314 | 6,314 | - | - | - | - | - | - | - | 1,160 | 225,765 | - | - |
| Period 3d Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3d.3.1 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 28 | 4 | 32 | - | 32 | - | - | - | - | - | - | - | - | - | - |
| 3d.3 | Subtotal Period 3d Collateral Costs | - | - | - | - | - | - | 28 | 4 | 32 | - | 32 | - | - | - | - | - | - | - | - | - | - |

**Monticello Nuclear Generating Plant
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**Table F
Monticello Nuclear Generating Plant
DECON Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|--------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| Period 3d Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3d.4.1 | Insurance | - | - | - | - | - | - | 27 | 3 | 30 | 30 | - | - | - | - | - | - | - | - | - | - | |
| 3d.4.2 | Property taxes | - | - | - | - | - | - | 35 | 3 | 38 | 38 | - | - | - | - | - | - | - | - | - | - | |
| 3d.4.3 | Plant energy budget | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | |
| 3d.4.4 | NRC ISFSI Fees | - | - | - | - | - | - | 8 | 1 | 9 | - | 9 | - | - | - | - | - | - | - | - | - | |
| 3d.4.5 | Emergency Planning Fees | - | - | - | - | - | - | 6 | 1 | 6 | - | 6 | - | - | - | - | - | - | - | - | - | |
| 3d.4.6 | Fixed Overhead | - | - | - | - | - | - | 8 | 1 | 10 | 10 | - | - | - | - | - | - | - | - | - | - | |
| 3d.4.7 | Railroad Track Maintenance | - | - | - | - | - | - | 5 | 1 | 6 | 6 | - | - | - | - | - | - | - | - | - | - | |
| 3d.4.8 | Security Staff Cost | - | - | - | - | - | - | 165 | 25 | 190 | 190 | - | - | - | - | - | - | - | - | - | 2,074 | |
| 3d.4.9 | Utility Staff Cost | - | - | - | - | - | - | 39 | 6 | 45 | 45 | - | - | - | - | - | - | - | - | - | 539 | |
| 3d.4 | Subtotal Period 3d Period-Dependent Costs | - | - | - | - | - | - | 293 | 40 | 333 | 318 | 15 | - | - | - | - | - | - | - | - | 2,613 | |
| 3d.0 | TOTAL PERIOD 3d COST | - | - | 1,083 | - | - | 4,313 | 321 | 962 | 6,678 | 6,632 | 47 | - | - | - | - | - | 1,160 | 225,765 | - | 2,613 | |
| PERIOD 3e - ISFSI Decontamination | | | | | | | | | | | | | | | | | | | | | | |
| Period 3e Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Period 3e Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3e.2.1 | License Termination ISFSI | - | 0 | 3 | 33 | - | 283 | 2,086 | 602 | 3,008 | 3,008 | - | - | - | 848 | - | - | - | - | 131,507 | 10,502 | 2,225 |
| 3e.2 | Subtotal Period 3e Additional Costs | - | 0 | 3 | 33 | - | 283 | 2,086 | 602 | 3,008 | 3,008 | - | - | - | 848 | - | - | - | - | 131,507 | 10,502 | 2,225 |
| Period 3e Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3e.4.1 | Insurance | - | - | - | - | - | - | 118 | 30 | 148 | 148 | - | - | - | - | - | - | - | - | - | - | |
| 3e.4.2 | Property taxes | - | - | - | - | - | - | 249 | 62 | 312 | 312 | - | - | - | - | - | - | - | - | - | - | |
| 3e.4.3 | Plant energy budget | - | - | - | - | - | - | 12 | 3 | 15 | 15 | - | - | - | - | - | - | - | - | - | - | |
| 3e.4.4 | Fixed Overhead | - | - | - | - | - | - | 71 | 18 | 89 | 89 | - | - | - | - | - | - | - | - | - | - | |
| 3e.4.5 | Railroad Track Maintenance | - | - | - | - | - | - | 41 | 10 | 52 | 52 | - | - | - | - | - | - | - | - | - | - | |
| 3e.4.6 | Security Staff Cost | - | - | - | - | - | - | 352 | 88 | 440 | 440 | - | - | - | - | - | - | - | - | - | 4,999 | |
| 3e.4.7 | Utility Staff Cost | - | - | - | - | - | - | 261 | 65 | 326 | 326 | - | - | - | - | - | - | - | - | - | 3,792 | |
| 3e.4 | Subtotal Period 3e Period-Dependent Costs | - | - | - | - | - | - | 1,105 | 276 | 1,381 | 1,381 | - | - | - | - | - | - | - | - | - | 8,792 | |
| 3e.0 | TOTAL PERIOD 3e COST | - | 0 | 3 | 33 | - | 283 | 3,191 | 878 | 4,389 | 4,389 | - | - | - | 848 | - | - | - | - | 131,507 | 10,502 | 11,017 |
| PERIOD 3f - ISFSI Site Restoration | | | | | | | | | | | | | | | | | | | | | | |
| Period 3f Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Period 3f Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3f.2.1 | Demolition and Site Restoration of ISFSI | - | 1,564 | - | - | - | - | 256 | 273 | 2,093 | - | - | 2,093 | - | - | - | - | - | - | - | 7,309 | 160 |
| 3f.2 | Subtotal Period 3f Additional Costs | - | 1,564 | - | - | - | - | 256 | 273 | 2,093 | - | - | 2,093 | - | - | - | - | - | - | - | 7,309 | 160 |
| Period 3f Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3f.3.1 | Small tool allowance | - | 11 | - | - | - | - | - | 2 | 12 | - | - | 12 | - | - | - | - | - | - | - | - | - |
| 3f.3 | Subtotal Period 3f Collateral Costs | - | 11 | - | - | - | - | - | 2 | 12 | - | - | 12 | - | - | - | - | - | - | - | - | - |
| Period 3f Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3f.4.2 | Property taxes | - | - | - | - | - | - | 126 | 13 | 138 | - | - | 138 | - | - | - | - | - | - | - | - | - |
| 3f.4.3 | Heavy equipment rental | - | 117 | - | - | - | - | - | 17 | 134 | - | - | 134 | - | - | - | - | - | - | - | - | - |
| 3f.4.4 | Plant energy budget | - | - | - | - | - | - | 6 | 1 | 7 | - | - | 7 | - | - | - | - | - | - | - | - | |
| 3f.4.5 | Fixed Overhead | - | - | - | - | - | - | 36 | 5 | 41 | - | - | 41 | - | - | - | - | - | - | - | - | |
| 3f.4.6 | Railroad Track Maintenance | - | - | - | - | - | - | 21 | 3 | 24 | - | - | 24 | - | - | - | - | - | - | - | - | |
| 3f.4.7 | Security Staff Cost | - | - | - | - | - | - | 177 | 27 | 204 | - | - | 204 | - | - | - | - | - | - | - | 2,520 | |
| 3f.4.8 | Utility Staff Cost | - | - | - | - | - | - | 109 | 16 | 126 | - | - | 126 | - | - | - | - | - | - | - | 1,564 | |
| 3f.4 | Subtotal Period 3f Period-Dependent Costs | - | 117 | - | - | - | - | 475 | 82 | 674 | - | - | 674 | - | - | - | - | - | - | - | 4,084 | |
| 3f.0 | TOTAL PERIOD 3f COST | - | 1,691 | - | - | - | - | 731 | 357 | 2,779 | - | - | 2,779 | - | - | - | - | - | - | - | 7,309 | 4,244 |
| PERIOD 3 TOTALS | | | | | | | | | | | | | | | | | | | | | | |
| TOTAL COST TO DECOMMISSION | | | | | | | | | | | | | | | | | | | | | | |
| | | 17,263 | 95,300 | 21,839 | 11,878 | 49,952 | 84,522 | 3,789,008 | 628,746 | 4,698,509 | 776,228 | 3,848,543 | 73,737 | 288,203 | 197,266 | 1,992 | 898 | 1,160 | 24,478,380 | 849,601 | 20,376,470 | |

**Monticello Nuclear Generating Plant
 Decommissioning Cost Analysis**

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**Table F
 Monticello Nuclear Generating Plant
 DECON Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
 (Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|----------------------|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| TOTAL COST TO DECOMMISSION WITH 15.45% CONTINGENCY: | | | | | \$4,698,509 | thousands of 2020 dollars | | | | | | | | | | | | | | | |
| TOTAL NRC LICENSE TERMINATION COST IS 16.52% OR: | | | | | \$776,228 | thousands of 2020 dollars | | | | | | | | | | | | | | | |
| SPENT FUEL MANAGEMENT COST IS 81.91% OR: | | | | | \$3,848,543 | thousands of 2020 dollars | | | | | | | | | | | | | | | |
| NON-NUCLEAR DEMOLITION COST IS 1.57% OR: | | | | | \$73,737 | thousands of 2020 dollars | | | | | | | | | | | | | | | |
| TOTAL LOW-LEVEL RADIOACTIVE WASTE VOLUME BURIED (EXCLUDING GTCC): | | | | | 200,155 | Cubic Feet | | | | | | | | | | | | | | | |
| TOTAL GREATER THAN CLASS C RADWASTE VOLUME GENERATED: | | | | | 1,160 | Cubic Feet | | | | | | | | | | | | | | | |
| TOTAL SCRAP METAL REMOVED: | | | | | 23,123 | Tons | | | | | | | | | | | | | | | |
| TOTAL CRAFT LABOR REQUIREMENTS: | | | | | 849,601 | Man-hours | | | | | | | | | | | | | | | |

End Notes:
 n/a - indicates that this activity not charged as decommissioning expense
 a - indicates that this activity performed by decommissioning staff
 0 - indicates that this value is less than 0.5 but is non-zero
 A cell containing " - " indicates a zero value

***Monticello Nuclear Generating Plant
Decommissioning Cost Analysis***

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APPENDIX G

DETAILED COST ANALYSIS

SCENARIO 5: SAFSTOR with 42 Year DFS

**Monticello Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table G
Monticello Nuclear Generating Plant
SAFSTOR Decommissioning Cost Estimate with DOE Pickup of Industry Fuel Starting in 2035
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|--|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| PERIOD 1a - Shutdown through Transition | | | | | | | | | | | | | | | | | | | | | |
| Period 1a Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| 1a.1.1 | SAFSTOR site characterization survey | - | - | - | - | - | - | 415 | 124 | 539 | 539 | - | - | - | - | - | - | - | - | - | - |
| 1a.1.2 | Prepare preliminary decommissioning cost | - | - | - | - | - | - | 167 | 25 | 192 | 192 | - | - | - | - | - | - | - | - | - | 1,300 |
| 1a.1.3 | Notification of Cessation of Operations | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.4 | Remove fuel & source material | - | - | - | - | - | - | - | - | n/a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.5 | Notification of Permanent Defueling | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.6 | Deactivate plant systems & process waste | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.7 | Prepare and submit PSDAR | - | - | - | - | - | - | 257 | 39 | 296 | 296 | - | - | - | - | - | - | - | - | - | 2,000 |
| 1a.1.8 | Review plant dwgs & specs. | - | - | - | - | - | - | 167 | 25 | 192 | 192 | - | - | - | - | - | - | - | - | - | 1,300 |
| 1a.1.9 | Perform detailed rad survey | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.10 | Estimate by-product inventory | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| 1a.1.11 | End product description | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| 1a.1.12 | Detailed by-product inventory | - | - | - | - | - | - | 193 | 29 | 222 | 222 | - | - | - | - | - | - | - | - | - | 1,500 |
| 1a.1.13 | Define major work sequence | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| 1a.1.14 | Perform SER and EA | - | - | - | - | - | - | 398 | 60 | 458 | 458 | - | - | - | - | - | - | - | - | - | 3,100 |
| 1a.1.15 | Perform Site-Specific Cost Study | - | - | - | - | - | - | 643 | 96 | 739 | 739 | - | - | - | - | - | - | - | - | - | 5,000 |
| Activity Specifications | | | | | | | | | | | | | | | | | | | | | |
| 1a.1.16.1 | Prepare plant and facilities for SAFSTOR | - | - | - | - | - | - | 632 | 95 | 727 | 727 | - | - | - | - | - | - | - | - | - | 4,920 |
| 1a.1.16.2 | Plant systems | - | - | - | - | - | - | 536 | 80 | 616 | 616 | - | - | - | - | - | - | - | - | - | 4,167 |
| 1a.1.16.3 | Plant structures and buildings | - | - | - | - | - | - | 401 | 60 | 461 | 461 | - | - | - | - | - | - | - | - | - | 3,120 |
| 1a.1.16.4 | Waste management | - | - | - | - | - | - | 257 | 39 | 296 | 296 | - | - | - | - | - | - | - | - | - | 2,000 |
| 1a.1.16.5 | Facility and site dormancy | - | - | - | - | - | - | 257 | 39 | 296 | 296 | - | - | - | - | - | - | - | - | - | 2,000 |
| 1a.1.16 | Total | - | - | - | - | - | - | 2,083 | 312 | 2,395 | 2,395 | - | - | - | - | - | - | - | - | - | 16,207 |
| Detailed Work Procedures | | | | | | | | | | | | | | | | | | | | | |
| 1a.1.17.1 | Plant systems | - | - | - | - | - | - | 152 | 23 | 175 | 175 | - | - | - | - | - | - | - | - | - | 1,183 |
| 1a.1.17.2 | Facility closeout & dormancy | - | - | - | - | - | - | 154 | 23 | 177 | 177 | - | - | - | - | - | - | - | - | - | 1,200 |
| 1a.1.17 | Total | - | - | - | - | - | - | 306 | 46 | 352 | 352 | - | - | - | - | - | - | - | - | - | 2,383 |
| 1a.1.18 | Procure vacuum drying system | - | - | - | - | - | - | 13 | 2 | 15 | 15 | - | - | - | - | - | - | - | - | - | 100 |
| 1a.1.19 | Drain/de-energize non-cont. systems | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.20 | Drain & dry NSSS | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.21 | Drain/de-energize contaminated systems | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.22 | Decon/secure contaminated systems | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1 | Subtotal Period 1a Activity Costs | - | - | - | - | - | - | 5,027 | 816 | 5,844 | 5,844 | - | - | - | - | - | - | - | - | - | 35,890 |
| Period 1a Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 1a.3.1 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 1,323 | 198 | 1,522 | - | 1,522 | - | - | - | - | - | - | - | - | - |
| 1a.3.2 | Retention and Severance | - | - | - | - | - | - | 9,892 | 1,484 | 11,376 | 11,376 | - | - | - | - | - | - | - | - | - | - |
| 1a.3 | Subtotal Period 1a Collateral Costs | - | - | - | - | - | - | 11,215 | 1,682 | 12,897 | 11,376 | 1,522 | - | - | - | - | - | - | - | - | - |
| Period 1a Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 1a.4.1 | Insurance | - | - | - | - | - | - | 2,328 | 233 | 2,561 | 2,561 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.2 | Property taxes | - | - | - | - | - | - | 3,570 | 357 | 3,927 | 3,927 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.3 | Health physics supplies | - | 614 | - | - | - | - | - | 153 | 767 | 767 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.4 | Heavy equipment rental | - | 753 | - | - | - | - | - | 113 | 866 | 866 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.5 | Disposal of DAW generated | - | - | 12 | 6 | - | 50 | - | 15 | 83 | 83 | - | - | - | 610 | - | - | - | 12,190 | 20 | - |
| 1a.4.6 | Plant energy budget | - | - | - | - | - | - | 1,817 | 272 | 2,089 | 2,089 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.7 | NRC Fees | - | - | - | - | - | - | 892 | 89 | 981 | 981 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.8 | Emergency Planning Fees | - | - | - | - | - | - | 3,428 | 343 | 3,770 | - | 3,770 | - | - | - | - | - | - | - | - | - |
| 1a.4.9 | Fixed Overhead | - | - | - | - | - | - | 2,616 | 392 | 3,009 | 3,009 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.10 | Spent Fuel Pool O&M | - | - | - | - | - | - | 845 | 127 | 971 | - | 971 | - | - | - | - | - | - | - | - | - |
| 1a.4.11 | ISFSI Operating Costs | - | - | - | - | - | - | 112 | 17 | 129 | - | 129 | - | - | - | - | - | - | - | - | - |
| 1a.4.12 | Railroad Track Maintenance | - | - | - | - | - | - | 125 | 19 | 144 | 144 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.13 | Security Staff Cost | - | - | - | - | - | - | 16,372 | 2,456 | 18,827 | 18,827 | - | - | - | - | - | - | - | - | - | 245,440 |
| 1a.4.14 | Utility Staff Cost | - | - | - | - | - | - | 27,285 | 4,093 | 31,378 | 31,378 | - | - | - | - | - | - | - | - | - | 422,240 |
| 1a.4 | Subtotal Period 1a Period-Dependent Costs | - | 1,367 | 12 | 6 | - | 50 | 59,389 | 8,679 | 69,502 | 64,632 | 4,870 | - | - | 610 | - | - | - | 12,190 | 20 | 667,680 |
| 1a.0 | TOTAL PERIOD 1a COST | - | 1,367 | 12 | 6 | - | 50 | 75,631 | 11,177 | 88,244 | 81,852 | 6,392 | - | - | 610 | - | - | - | 12,190 | 20 | 703,570 |

**Monticello Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table G
Monticello Nuclear Generating Plant
SAFSTOR Decommissioning Cost Estimate with DOE Pickup of Industry Fuel Starting in 2035
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|--|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|---------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| PERIOD 1b - SAFSTOR Limited DECON Activities | | | | | | | | | | | | | | | | | | | | | | |
| Period 1b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Decontamination of Site Buildings | | | | | | | | | | | | | | | | | | | | | | |
| 1b.1.1.1 | Reactor Building | 5,155 | - | - | - | - | - | - | 2,577 | 7,732 | 7,732 | - | - | - | - | - | - | - | - | - | 70,157 | - |
| 1b.1.1.2 | Admin | 106 | - | - | - | - | - | - | 53 | 159 | 159 | - | - | - | - | - | - | - | - | - | 1,526 | - |
| 1b.1.1.3 | HPCI Room | 28 | - | - | - | - | - | - | 14 | 42 | 42 | - | - | - | - | - | - | - | - | - | 391 | - |
| 1b.1.1.4 | Hot Shop | 16 | - | - | - | - | - | - | 8 | 24 | 24 | - | - | - | - | - | - | - | - | - | 234 | - |
| 1b.1.1.5 | LLRW Storage & Shipping | 54 | - | - | - | - | - | - | 27 | 82 | 82 | - | - | - | - | - | - | - | - | - | 788 | - |
| 1b.1.1.6 | Offgas Stack | 362 | - | - | - | - | - | - | 181 | 542 | 542 | - | - | - | - | - | - | - | - | - | 5,112 | - |
| 1b.1.1.7 | Offgas Storage & Compressor | 38 | - | - | - | - | - | - | 19 | 57 | 57 | - | - | - | - | - | - | - | - | - | 550 | - |
| 1b.1.1.8 | Radwaste | 114 | - | - | - | - | - | - | 57 | 171 | 171 | - | - | - | - | - | - | - | - | - | 1,647 | - |
| 1b.1.1.9 | Radwaste Material Storage Warehouse | 60 | - | - | - | - | - | - | 30 | 90 | 90 | - | - | - | - | - | - | - | - | - | 864 | - |
| 1b.1.1.10 | Recombiner | 25 | - | - | - | - | - | - | 13 | 38 | 38 | - | - | - | - | - | - | - | - | - | 363 | - |
| 1b.1.1.11 | Turbine | 664 | - | - | - | - | - | - | 332 | 996 | 996 | - | - | - | - | - | - | - | - | - | 9,600 | - |
| 1b.1.1.12 | Turbine Building Addition | 55 | - | - | - | - | - | - | 27 | 82 | 82 | - | - | - | - | - | - | - | - | - | 793 | - |
| 1b.1.1.13 | Reactor (Post Fuel) | 924 | - | - | - | - | - | - | 462 | 1,386 | 1,386 | - | - | - | - | - | - | - | - | - | 12,653 | - |
| 1b.1.1 | Totals | 7,601 | - | - | - | - | - | - | 3,800 | 11,401 | 11,401 | - | - | - | - | - | - | - | - | - | 104,679 | - |
| 1b.1 | Subtotal Period 1b Activity Costs | 7,601 | - | - | - | - | - | - | 3,800 | 11,401 | 11,401 | - | - | - | - | - | - | - | - | - | 104,679 | - |
| Period 1b Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 1b.2.1 | Spent Fuel Pool Isolation | - | - | - | - | - | - | 12,675 | 1,901 | 14,576 | 14,576 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.2 | Subtotal Period 1b Additional Costs | - | - | - | - | - | - | 12,675 | 1,901 | 14,576 | 14,576 | - | - | - | - | - | - | - | - | - | - | - |
| Period 1b Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 1b.3.1 | Decon equipment | 1,055 | - | - | - | - | - | - | 158 | 1,213 | 1,213 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.3.2 | Process decommissioning water waste | 220 | - | 146 | 259 | - | 589 | - | 310 | 1,523 | 1,523 | - | - | - | 1,352 | - | - | - | - | - | 81,127 | 264 |
| 1b.3.4 | Small tool allowance | - | 130 | - | - | - | - | - | 20 | 150 | 150 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.3.5 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 196 | 29 | 225 | - | 225 | - | - | - | - | - | - | - | - | - | - |
| 1b.3.6 | Retention and Severance | - | - | - | - | - | - | 3,601 | 540 | 4,141 | 4,141 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.3 | Subtotal Period 1b Collateral Costs | 1,275 | 130 | 146 | 259 | - | 589 | 3,796 | 1,058 | 7,252 | 7,027 | 225 | - | - | 1,352 | - | - | - | - | - | 81,127 | 264 |
| Period 1b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 1b.4.1 | Decon supplies | 1,562 | - | - | - | - | - | - | 391 | 1,953 | 1,953 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.2 | Insurance | - | - | - | - | - | - | 580 | 58 | 638 | 638 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.3 | Property taxes | - | - | - | - | - | - | 890 | 89 | 979 | 979 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.4 | Health physics supplies | - | 750 | - | - | - | - | - | 187 | 937 | 937 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.5 | Heavy equipment rental | - | 188 | - | - | - | - | - | 28 | 216 | 216 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.6 | Disposal of DAW generated | - | - | 12 | 6 | - | 48 | - | 14 | 80 | 80 | - | - | - | 588 | - | - | - | - | - | 11,769 | 19 |
| 1b.4.7 | Plant energy budget | - | - | - | - | - | - | 453 | 68 | 521 | 521 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.8 | NRC Fees | - | - | - | - | - | - | 161 | 16 | 177 | 177 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.9 | Emergency Planning Fees | - | - | - | - | - | - | 708 | 71 | 779 | - | 779 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.10 | Fixed Overhead | - | - | - | - | - | - | 652 | 98 | 750 | 750 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.11 | Spent Fuel Pool O&M | - | - | - | - | - | - | 211 | 32 | 242 | - | 242 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.12 | ISFSI Operating Costs | - | - | - | - | - | - | 28 | 4 | 32 | - | 32 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.13 | Railroad Track Maintenance | - | - | - | - | - | - | 31 | 5 | 36 | 36 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.14 | Security Staff Cost | - | - | - | - | - | - | 4,082 | 612 | 4,694 | 4,694 | - | - | - | - | - | - | - | - | - | - | 61,192 |
| 1b.4.15 | Utility Staff Cost | - | - | - | - | - | - | 6,803 | 1,020 | 7,823 | 7,823 | - | - | - | - | - | - | - | - | - | - | 105,271 |
| 1b.4 | Subtotal Period 1b Period-Dependent Costs | 1,562 | 938 | 12 | 6 | - | 48 | 14,599 | 2,693 | 19,858 | 18,805 | 1,053 | - | - | 588 | - | - | - | - | - | 11,769 | 19 |
| 1b.0 | TOTAL PERIOD 1b COST | 10,438 | 1,068 | 157 | 265 | - | 637 | 31,070 | 9,453 | 53,088 | 51,810 | 1,278 | - | - | 1,941 | - | - | - | - | - | 92,896 | 104,962 |
| PERIOD 1c - Preparations for SAFSTOR Dormancy | | | | | | | | | | | | | | | | | | | | | | |
| Period 1c Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| 1c.1.1 | Prepare support equipment for storage | - | 527 | - | - | - | - | - | 79 | 606 | 606 | - | - | - | - | - | - | - | - | - | - | 3,000 |
| 1c.1.2 | Install containment pressure equal. lines | - | 54 | - | - | - | - | - | 8 | 62 | 62 | - | - | - | - | - | - | - | - | - | - | 700 |
| 1c.1.3 | Interim survey prior to dormancy | - | - | - | - | - | - | 733 | 220 | 953 | 953 | - | - | - | - | - | - | - | - | - | - | 12,801 |
| 1c.1.4 | Secure building accesses | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - | - |
| 1c.1.5 | Prepare & submit interim report | - | - | - | - | - | - | 75 | 11 | 86 | 86 | - | - | - | - | - | - | - | - | - | - | 583 |
| 1c.1 | Subtotal Period 1c Activity Costs | - | 581 | - | - | - | - | 808 | 318 | 1,707 | 1,707 | - | - | - | - | - | - | - | - | - | - | 16,501 |
| Period 1c Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 1c.3.1 | Process decommissioning water waste | 161 | - | 107 | 190 | - | 433 | - | 228 | 1,120 | 1,120 | - | - | - | 994 | - | - | - | - | - | 59,653 | 194 |

**Monticello Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table G
Monticello Nuclear Generating Plant
SAFSTOR Decommissioning Cost Estimate with DOE Pickup of Industry Fuel Starting in 2035
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|---|---------------|--------------|-----------------|-----------------|---------------------------|---------------------|----------------|-------------------|----------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| Period 1c Collateral Costs (continued) | | | | | | | | | | | | | | | | | | | | | |
| 1c.3.3 | Small tool allowance | - | 5 | - | - | - | - | - | 1 | 6 | 6 | - | - | - | - | - | - | - | - | - | - |
| 1c.3.4 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 195 | 29 | 225 | - | 225 | - | - | - | - | - | - | - | - | - |
| 1c.3.5 | Retention and Severance | - | - | - | - | - | - | 2,734 | 410 | 3,145 | 3,145 | - | - | - | - | - | - | - | - | - | - |
| 1c.3 | Subtotal Period 1c Collateral Costs | 161 | 5 | 107 | 190 | - | 433 | 2,930 | 668 | 4,495 | 4,270 | 225 | - | - | 994 | - | - | - | 59,653 | 194 | - |
| Period 1c Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 1c.4.1 | Insurance | - | - | - | - | - | - | 580 | 58 | 638 | 638 | - | - | - | - | - | - | - | - | - | - |
| 1c.4.2 | Property taxes | - | - | - | - | - | - | 888 | 89 | 977 | 977 | - | - | - | - | - | - | - | - | - | - |
| 1c.4.3 | Health physics supplies | - | 248 | - | - | - | - | - | 62 | 310 | 310 | - | - | - | - | - | - | - | - | - | - |
| 1c.4.4 | Heavy equipment rental | - | 188 | - | - | - | - | - | 28 | 216 | 216 | - | - | - | - | - | - | - | - | - | - |
| 1c.4.5 | Disposal of DAW generated | - | - | 3 | 2 | - | 13 | - | 4 | 21 | 21 | - | - | - | 152 | - | - | - | 3,039 | 5 | - |
| 1c.4.6 | Plant energy budget | - | - | - | - | - | - | 453 | 68 | 521 | 521 | - | - | - | - | - | - | - | - | - | - |
| 1c.4.7 | NRC Fees | - | - | - | - | - | - | 161 | 16 | 177 | 177 | - | - | - | - | - | - | - | - | - | - |
| 1c.4.8 | Emergency Planning Fees | - | - | - | - | - | - | 708 | 71 | 779 | - | 779 | - | - | - | - | - | - | - | - | - |
| 1c.4.9 | Fixed Overhead | - | - | - | - | - | - | 652 | 98 | 750 | 750 | - | - | - | - | - | - | - | - | - | - |
| 1c.4.10 | Spent Fuel Pool O&M | - | - | - | - | - | - | 211 | 32 | 242 | - | 242 | - | - | - | - | - | - | - | - | - |
| 1c.4.11 | ISFSI Operating Costs | - | - | - | - | - | - | 28 | 4 | 32 | - | 32 | - | - | - | - | - | - | - | - | - |
| 1c.4.12 | Railroad Track Maintenance | - | - | - | - | - | - | 31 | 5 | 36 | 36 | - | - | - | - | - | - | - | - | - | - |
| 1c.4.13 | Security Staff Cost | - | - | - | - | - | - | 4,082 | 612 | 4,694 | 4,694 | - | - | - | - | - | - | - | - | - | 61,192 |
| 1c.4.14 | Utility Staff Cost | - | - | - | - | - | - | 6,803 | 1,020 | 7,823 | 7,823 | - | - | - | - | - | - | - | - | - | 105,271 |
| 1c.4 | Subtotal Period 1c Period-Dependent Costs | - | 436 | 3 | 2 | - | 13 | 14,597 | 2,166 | 17,216 | 16,163 | 1,053 | - | - | 152 | - | - | - | 3,039 | 5 | 166,463 |
| 1c.0 | TOTAL PERIOD 1c COST | 161 | 1,021 | 110 | 192 | - | 446 | 18,335 | 3,153 | 23,418 | 22,140 | 1,278 | - | - | 1,146 | - | - | - | 62,692 | 16,700 | 167,046 |
| PERIOD 1 TOTALS | | 10,599 | 3,456 | 279 | 463 | - | 1,133 | 125,036 | 23,783 | 164,750 | 155,802 | 8,948 | - | - | 3,696 | - | - | - | 167,779 | 121,681 | 1,037,079 |
| PERIOD 2a - SAFSTOR Dormancy with Wet Spent Fuel Storage | | | | | | | | | | | | | | | | | | | | | |
| Period 2a Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| 2a.1.1 | Quarterly Inspection | - | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - |
| 2a.1.2 | Semi-annual environmental survey | - | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - |
| 2a.1.3 | Prepare reports | - | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - |
| 2a.1.4 | Bituminous roof replacement | - | - | - | - | - | - | 155 | 23 | 178 | 178 | - | - | - | - | - | - | - | - | - | - |
| 2a.1.5 | Maintenance supplies | - | - | - | - | - | - | 349 | 87 | 437 | 437 | - | - | - | - | - | - | - | - | - | - |
| 2a.1 | Subtotal Period 2a Activity Costs | - | - | - | - | - | - | 504 | 111 | 615 | 615 | - | - | - | - | - | - | - | - | - | - |
| Period 2a Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 2a.2.1 | Security Modifications | - | - | - | - | - | - | 8,696 | 1,304 | 10,000 | 10,000 | - | - | - | - | - | - | - | - | - | - |
| 2a.2 | Subtotal Period 2a Additional Costs | - | - | - | - | - | - | 8,696 | 1,304 | 10,000 | 10,000 | - | - | - | - | - | - | - | - | - | - |
| Period 2a Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 2a.3.1 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 130,915 | 19,637 | 150,553 | - | 150,553 | - | - | - | - | - | - | - | - | - |
| 2a.3.2 | Retention and Severance | - | - | - | - | - | - | 19,427 | 2,914 | 22,341 | 22,341 | - | - | - | - | - | - | - | - | - | - |
| 2a.3 | Subtotal Period 2a Collateral Costs | - | - | - | - | - | - | 150,342 | 22,551 | 172,893 | 22,341 | 150,553 | - | - | - | - | - | - | - | - | - |
| Period 2a Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 2a.4.1 | Insurance | - | - | - | - | - | - | 1,761 | 176 | 1,937 | 1,937 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.2 | Property taxes | - | - | - | - | - | - | 8,932 | 893 | 9,825 | 9,825 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.3 | Health physics supplies | - | 617 | - | - | - | - | - | 154 | 771 | 771 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.4 | Disposal of DAW generated | - | - | 11 | 6 | - | 47 | - | 14 | 79 | 79 | - | - | - | 576 | - | - | - | 11,523 | 19 | - |
| 2a.4.5 | Plant energy budget | - | - | - | - | - | - | 910 | 136 | 1,046 | 1,046 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.6 | NRC Fees | - | - | - | - | - | - | 610 | 61 | 671 | 671 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.7 | Emergency Planning Fees | - | - | - | - | - | - | 7,110 | 711 | 7,821 | - | 7,821 | - | - | - | - | - | - | - | - | - |
| 2a.4.8 | Fixed Overhead | - | - | - | - | - | - | 5,306 | 796 | 6,102 | 6,102 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.9 | Spent Fuel Pool O&M | - | - | - | - | - | - | 2,115 | 317 | 2,432 | - | 2,432 | - | - | - | - | - | - | - | - | - |
| 2a.4.10 | ISFSI Operating Costs | - | - | - | - | - | - | 280 | 42 | 322 | - | 322 | - | - | - | - | - | - | - | - | - |
| 2a.4.11 | Railroad Track Maintenance | - | - | - | - | - | - | 639 | 96 | 735 | 735 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.12 | Security Staff Cost | - | - | - | - | - | - | 37,806 | 5,671 | 43,477 | 31,086 | 12,391 | - | - | - | - | - | - | - | - | 562,523 |
| 2a.4.13 | Utility Staff Cost | - | - | - | - | - | - | 13,543 | 2,031 | 15,574 | 12,615 | 2,959 | - | - | - | - | - | - | - | - | 205,738 |
| 2a.4 | Subtotal Period 2a Period-Dependent Costs | - | 617 | 11 | 6 | - | 47 | 79,012 | 11,099 | 90,793 | 64,868 | 25,925 | - | - | 576 | - | - | - | 11,523 | 19 | 768,261 |
| 2a.0 | TOTAL PERIOD 2a COST | - | 617 | 11 | 6 | - | 47 | 238,554 | 35,065 | 274,301 | 97,823 | 176,478 | - | - | 576 | - | - | - | 11,523 | 19 | 768,261 |

**Monticello Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table G
Monticello Nuclear Generating Plant
SAFSTOR Decommissioning Cost Estimate with DOE Pickup of Industry Fuel Starting in 2035
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| PERIOD 2b - SAFSTOR Dormancy with Dry Spent Fuel Storage | | | | | | | | | | | | | | | | | | | | | |
| Period 2b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| 2b.1.1 | Quarterly Inspection | | | | | | | | | a | | | | | | | | | | | |
| 2b.1.2 | Semi-annual environmental survey | | | | | | | | | a | | | | | | | | | | | |
| 2b.1.3 | Prepare reports | | | | | | | | | a | | | | | | | | | | | |
| 2b.1.4 | Bituminous roof replacement | - | - | - | - | - | - | 2,368 | 355 | 2,723 | 2,723 | - | - | - | - | - | - | - | - | - | - |
| 2b.1.5 | Maintenance supplies | - | - | - | - | - | - | 5,351 | 1,338 | 6,689 | 6,689 | - | - | - | - | - | - | - | - | - | - |
| 2b.1 | Subtotal Period 2b Activity Costs | - | - | - | - | - | - | 7,719 | 1,693 | 9,412 | 9,412 | - | - | - | - | - | - | - | - | - | - |
| Period 2b Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 2b.3.1 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 41,993 | 6,299 | 48,292 | - | 48,292 | - | - | - | - | - | - | - | - | - |
| 2b.3 | Subtotal Period 2b Collateral Costs | - | - | - | - | - | - | 41,993 | 6,299 | 48,292 | - | 48,292 | - | - | - | - | - | - | - | - | - |
| Period 2b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 2b.4.1 | Insurance | - | - | - | - | - | - | 26,968 | 2,697 | 29,664 | 29,664 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.2 | Property taxes | - | - | - | - | - | - | 136,792 | 13,679 | 150,471 | 150,471 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.3 | Health physics supplies | - | 4,580 | - | - | - | - | - | 1,145 | 5,725 | 5,725 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.4 | Disposal of DAW generated | - | - | 84 | 43 | - | 349 | - | 102 | 579 | - | - | - | 4,238 | - | - | - | - | 84,754 | 138 | - |
| 2b.4.5 | Plant energy budget | - | - | - | - | - | - | 6,965 | 1,045 | 8,010 | 8,010 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.6 | NRC Fees | - | - | - | - | - | - | 8,721 | 872 | 9,594 | 9,594 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.7 | Emergency Planning Fees | - | - | - | - | - | - | 5,685 | 568 | 6,253 | - | 6,253 | - | - | - | - | - | - | - | - | - |
| 2b.4.8 | Fixed Overhead | - | - | - | - | - | - | 8,259 | 1,239 | 9,498 | 9,498 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.9 | ISFSI Operating Costs | - | - | - | - | - | - | 4,292 | 644 | 4,935 | - | 4,935 | - | - | - | - | - | - | - | - | - |
| 2b.4.10 | Railroad Track Maintenance | - | - | - | - | - | - | 4,794 | 719 | 5,514 | 5,514 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.11 | Security Staff Cost | - | - | - | - | - | - | 212,676 | 31,901 | 244,577 | 55,030 | 189,547 | - | - | - | - | - | - | - | - | 2,871,084 |
| 2b.4.12 | Utility Staff Cost | - | - | - | - | - | - | 86,757 | 13,014 | 99,770 | 54,475 | 45,296 | - | - | - | - | - | - | - | - | 1,276,037 |
| 2b.4 | Subtotal Period 2b Period-Dependent Costs | - | 4,580 | 84 | 43 | - | 349 | 501,908 | 67,625 | 574,590 | 328,559 | 246,032 | - | 4,238 | - | - | - | - | 84,754 | 138 | 4,147,121 |
| 2b.0 | TOTAL PERIOD 2b COST | - | 4,580 | 84 | 43 | - | 349 | 551,620 | 75,617 | 632,294 | 337,971 | 294,324 | - | 4,238 | - | - | - | - | 84,754 | 138 | 4,147,121 |
| PERIOD 2c - SAFSTOR Dormancy without Spent Fuel Storage | | | | | | | | | | | | | | | | | | | | | |
| Period 2c Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| 2c.1.1 | Quarterly Inspection | | | | | | | | | a | | | | | | | | | | | |
| 2c.1.2 | Semi-annual environmental survey | | | | | | | | | a | | | | | | | | | | | |
| 2c.1.3 | Prepare reports | | | | | | | | | a | | | | | | | | | | | |
| 2c.1.4 | Bituminous roof replacement | - | - | - | - | - | - | 759 | 114 | 872 | 872 | - | - | - | - | - | - | - | - | - | - |
| 2c.1.5 | Maintenance supplies | - | - | - | - | - | - | 1,714 | 429 | 2,143 | 2,143 | - | - | - | - | - | - | - | - | - | - |
| 2c.1 | Subtotal Period 2c Activity Costs | - | - | - | - | - | - | 2,473 | 542 | 3,015 | 3,015 | - | - | - | - | - | - | - | - | - | - |
| Period 2c Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 2c.4.1 | Insurance | - | - | - | - | - | - | 4,931 | 493 | 5,424 | 5,424 | - | - | - | - | - | - | - | - | - | - |
| 2c.4.2 | Property taxes | - | - | - | - | - | - | 37,270 | 3,727 | 40,997 | 40,997 | - | - | - | - | - | - | - | - | - | - |
| 2c.4.3 | Health physics supplies | - | 1,380 | - | - | - | - | - | 345 | 1,725 | 1,725 | - | - | - | - | - | - | - | - | - | - |
| 2c.4.4 | Disposal of DAW generated | - | - | 25 | 13 | - | 103 | - | 30 | 171 | 171 | - | - | 1,250 | - | - | - | - | 25,004 | 41 | - |
| 2c.4.5 | Plant energy budget | - | - | - | - | - | - | 2,231 | 335 | 2,566 | 2,566 | - | - | - | - | - | - | - | - | - | - |
| 2c.4.6 | NRC Fees | - | - | - | - | - | - | 2,520 | 252 | 2,772 | 2,772 | - | - | - | - | - | - | - | - | - | - |
| 2c.4.7 | Fixed Overhead | - | - | - | - | - | - | 2,646 | 397 | 3,042 | 3,042 | - | - | - | - | - | - | - | - | - | - |
| 2c.4.8 | Railroad Track Maintenance | - | - | - | - | - | - | 1,536 | 230 | 1,766 | 1,766 | - | - | - | - | - | - | - | - | - | - |
| 2c.4.9 | Security Staff Cost | - | - | - | - | - | - | 29,690 | 4,453 | 34,143 | 34,143 | - | - | - | - | - | - | - | - | - | 383,204 |
| 2c.4.10 | Utility Staff Cost | - | - | - | - | - | - | 14,429 | 2,164 | 16,593 | 16,593 | - | - | - | - | - | - | - | - | - | 223,536 |
| 2c.4 | Subtotal Period 2c Period-Dependent Costs | - | 1,380 | 25 | 13 | - | 103 | 95,252 | 12,427 | 109,199 | 109,199 | - | - | 1,250 | - | - | - | - | 25,004 | 41 | 606,740 |
| 2c.0 | TOTAL PERIOD 2c COST | - | 1,380 | 25 | 13 | - | 103 | 97,724 | 12,969 | 112,214 | 112,214 | - | - | 1,250 | - | - | - | - | 25,004 | 41 | 606,740 |
| PERIOD 2 TOTALS | | | | | | | | | | | | | | | | | | | | | |
| | | - | 6,577 | 120 | 62 | - | 500 | 887,899 | 123,652 | 1,018,809 | 548,008 | 470,802 | - | 6,064 | - | - | - | - | 121,281 | 198 | 5,522,123 |
| PERIOD 3a - Reactivate Site Following SAFSTOR Dormancy | | | | | | | | | | | | | | | | | | | | | |
| Period 3a Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| 3a.1.1 | Prepare preliminary decommissioning cost | - | - | - | - | - | - | 167 | 25 | 192 | 192 | - | - | - | - | - | - | - | - | - | 1,300 |
| 3a.1.2 | Review plant dwgs & specs. | - | - | - | - | - | - | 591 | 89 | 680 | 680 | - | - | - | - | - | - | - | - | - | 4,600 |
| 3a.1.3 | Perform detailed rad survey | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 3a.1.4 | End product description | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| 3a.1.5 | Detailed by-product inventory | - | - | - | - | - | - | 167 | 25 | 192 | 192 | - | - | - | - | - | - | - | - | - | 1,300 |
| 3a.1.6 | Define major work sequence | - | - | - | - | - | - | 964 | 145 | 1,108 | 1,108 | - | - | - | - | - | - | - | - | - | 7,500 |
| 3a.1.7 | Perform SER and EA | - | - | - | - | - | - | 398 | 60 | 458 | 458 | - | - | - | - | - | - | - | - | - | 3,100 |

**Monticello Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table G
Monticello Nuclear Generating Plant
SAFSTOR Decommissioning Cost Estimate with DOE Pickup of Industry Fuel Starting in 2035
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|--|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| Period 3a Direct Decommissioning Activities (continued) | | | | | | | | | | | | | | | | | | | | | |
| 3a.1.8 | Prepare/submit Defueled Technical Specifications | - | - | - | - | - | - | 964 | 145 | 1,108 | 1,108 | - | - | - | - | - | - | - | - | - | 7,500 |
| 3a.1.9 | Perform Site-Specific Cost Study | - | - | - | - | - | - | 643 | 96 | 739 | 739 | - | - | - | - | - | - | - | - | - | 5,000 |
| 3a.1.10 | Prepare/submit Irradiated Fuel Management Plan | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| Activity Specifications | | | | | | | | | | | | | | | | | | | | | |
| 3a.1.11.1 | Re-activate plant & temporary facilities | - | - | - | - | - | - | 947 | 142 | 1,089 | 980 | - | 109 | - | - | - | - | - | - | - | 7,370 |
| 3a.1.11.2 | Plant systems | - | - | - | - | - | - | 536 | 80 | 616 | 554 | - | 62 | - | - | - | - | - | - | - | 4,167 |
| 3a.1.11.3 | Reactor internals | - | - | - | - | - | - | 912 | 137 | 1,049 | 1,049 | - | - | - | - | - | - | - | - | - | 7,100 |
| 3a.1.11.4 | Reactor vessel | - | - | - | - | - | - | 835 | 125 | 961 | 961 | - | - | - | - | - | - | - | - | - | 6,500 |
| 3a.1.11.5 | Sacrificial shield | - | - | - | - | - | - | 64 | 10 | 74 | 74 | - | - | - | - | - | - | - | - | - | 500 |
| 3a.1.11.6 | Moisture separators/reheaters | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| 3a.1.11.7 | Reinforced concrete | - | - | - | - | - | - | 206 | 31 | 236 | 118 | - | 118 | - | - | - | - | - | - | - | 1,600 |
| 3a.1.11.8 | Main Turbine | - | - | - | - | - | - | 268 | 40 | 309 | 309 | - | - | - | - | - | - | - | - | - | 2,088 |
| 3a.1.11.9 | Main Condensers | - | - | - | - | - | - | 268 | 40 | 309 | 309 | - | - | - | - | - | - | - | - | - | 2,088 |
| 3a.1.11.10 | Pressure suppression structure | - | - | - | - | - | - | 257 | 39 | 296 | 296 | - | - | - | - | - | - | - | - | - | 2,000 |
| 3a.1.11.11 | Drywell | - | - | - | - | - | - | 206 | 31 | 236 | 236 | - | - | - | - | - | - | - | - | - | 1,600 |
| 3a.1.11.12 | Plant structures & buildings | - | - | - | - | - | - | 401 | 60 | 461 | 231 | - | 231 | - | - | - | - | - | - | - | 3,120 |
| 3a.1.11.13 | Waste management | - | - | - | - | - | - | 591 | 89 | 680 | 680 | - | - | - | - | - | - | - | - | - | 4,600 |
| 3a.1.11.14 | Facility & site closeout | - | - | - | - | - | - | 116 | 17 | 133 | 67 | - | 67 | - | - | - | - | - | - | - | 900 |
| 3a.1.11 | Total | - | - | - | - | - | - | 5,736 | 860 | 6,597 | 6,011 | - | 586 | - | - | - | - | - | - | - | 44,633 |
| Planning & Site Preparations | | | | | | | | | | | | | | | | | | | | | |
| 3a.1.12 | Prepare dismantling sequence | - | - | - | - | - | - | 308 | 46 | 355 | 355 | - | - | - | - | - | - | - | - | - | 2,400 |
| 3a.1.13 | Plant prep. & temp. svces | - | - | - | - | - | - | 3,500 | 525 | 4,025 | 4,025 | - | - | - | - | - | - | - | - | - | - |
| 3a.1.14 | Design water clean-up system | - | - | - | - | - | - | 180 | 27 | 207 | 207 | - | - | - | - | - | - | - | - | - | 1,400 |
| 3a.1.15 | Rigging/Cont. Cntrl Envlp/ooling/etc. | - | - | - | - | - | - | 2,400 | 360 | 2,760 | 2,760 | - | - | - | - | - | - | - | - | - | - |
| 3a.1.16 | Procure casks/liners & containers | - | - | - | - | - | - | 158 | 24 | 182 | 182 | - | - | - | - | - | - | - | - | - | 1,230 |
| 3a.1 | Subtotal Period 3a Activity Costs | - | - | - | - | - | - | 16,434 | 2,465 | 18,899 | 18,313 | - | 586 | - | - | - | - | - | - | - | 81,963 |
| Period 3a Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 3a.2.1 | Site Characterization | - | - | - | - | - | - | 5,930 | 1,779 | 7,708 | 7,708 | - | - | - | - | - | - | - | - | - | 30,500 |
| 3a.2.2 | Mixed & RCRA Waste | - | - | 28 | 29 | 14 | - | - | 9 | 80 | 80 | - | - | 43 | - | - | - | - | - | 5,253 | 161 |
| 3a.2 | Subtotal Period 3a Additional Costs | - | - | 28 | 29 | 14 | - | 5,930 | 1,788 | 7,788 | 7,788 | - | - | 43 | - | - | - | - | - | 5,253 | 30,661 |
| Period 3a Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 3a.4.1 | Insurance | - | - | - | - | - | - | 401 | 40 | 442 | 442 | - | - | - | - | - | - | - | - | - | - |
| 3a.4.2 | Property taxes | - | - | - | - | - | - | 2,945 | 295 | 3,240 | 3,240 | - | - | - | - | - | - | - | - | - | - |
| 3a.4.3 | Health physics supplies | - | 537 | - | - | - | - | - | 134 | 672 | 672 | - | - | - | - | - | - | - | - | - | - |
| 3a.4.4 | Heavy equipment rental | - | 753 | - | - | - | - | - | 113 | 866 | 866 | - | - | - | - | - | - | - | - | - | - |
| 3a.4.5 | Disposal of DAW generated | - | - | 10 | 5 | - | 42 | - | 12 | 70 | 70 | - | - | 514 | - | - | - | - | - | 10,287 | 17 |
| 3a.4.6 | Plant energy budget | - | - | - | - | - | - | 1,817 | 272 | 2,089 | 2,089 | - | - | - | - | - | - | - | - | - | - |
| 3a.4.7 | NRC Fees | - | - | - | - | - | - | 335 | 33 | 368 | 368 | - | - | - | - | - | - | - | - | - | - |
| 3a.4.8 | Fixed Overhead | - | - | - | - | - | - | 2,616 | 392 | 3,009 | 3,009 | - | - | - | - | - | - | - | - | - | - |
| 3a.4.9 | Railroad Track Maintenance | - | - | - | - | - | - | 125 | 19 | 144 | 144 | - | - | - | - | - | - | - | - | - | - |
| 3a.4.10 | Security Staff Cost | - | - | - | - | - | - | 4,441 | 666 | 5,107 | 5,107 | - | - | - | - | - | - | - | - | - | 65,000 |
| 3a.4.11 | Utility Staff Cost | - | - | - | - | - | - | 16,594 | 2,489 | 19,084 | 19,084 | - | - | - | - | - | - | - | - | - | 257,920 |
| 3a.4 | Subtotal Period 3a Period-Dependent Costs | - | 1,290 | 10 | 5 | - | 42 | 29,274 | 4,467 | 35,089 | 35,089 | - | - | 514 | - | - | - | - | - | 10,287 | 17 |
| 3a.0 | TOTAL PERIOD 3a COST | - | 1,290 | 38 | 34 | 14 | 42 | 51,638 | 8,720 | 61,777 | 61,191 | - | 586 | 43 | 514 | - | - | - | - | 15,540 | 30,678 |
| PERIOD 3b - Decommissioning Preparations | | | | | | | | | | | | | | | | | | | | | |
| Period 3b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| Detailed Work Procedures | | | | | | | | | | | | | | | | | | | | | |
| 3b.1.1.1 | Plant systems | - | - | - | - | - | - | 608 | 91 | 700 | 630 | - | 70 | - | - | - | - | - | - | - | 4,733 |
| 3b.1.1.2 | Reactor internals | - | - | - | - | - | - | 514 | 77 | 591 | 591 | - | - | - | - | - | - | - | - | - | 4,000 |
| 3b.1.1.3 | Remaining buildings | - | - | - | - | - | - | 174 | 26 | 200 | 50 | - | 150 | - | - | - | - | - | - | - | 1,350 |
| 3b.1.1.4 | CRD housings & NIs | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| 3b.1.1.5 | Incore instrumentation | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| 3b.1.1.6 | Removal primary containment | - | - | - | - | - | - | 257 | 39 | 296 | 296 | - | - | - | - | - | - | - | - | - | 2,000 |
| 3b.1.1.7 | Reactor vessel | - | - | - | - | - | - | 467 | 70 | 537 | 537 | - | - | - | - | - | - | - | - | - | 3,630 |
| 3b.1.1.8 | Facility closeout | - | - | - | - | - | - | 154 | 23 | 177 | 89 | - | 89 | - | - | - | - | - | - | - | 1,200 |
| 3b.1.1.9 | Sacrificial shield | - | - | - | - | - | - | 154 | 23 | 177 | 177 | - | - | - | - | - | - | - | - | - | 1,200 |
| 3b.1.1.10 | Reinforced concrete | - | - | - | - | - | - | 129 | 19 | 148 | 74 | - | 74 | - | - | - | - | - | - | - | 1,000 |
| 3b.1.1.11 | Main Turbine | - | - | - | - | - | - | 267 | 40 | 307 | 307 | - | - | - | - | - | - | - | - | - | 2,080 |
| 3b.1.1.12 | Main Condensers | - | - | - | - | - | - | 268 | 40 | 309 | 309 | - | - | - | - | - | - | - | - | - | 2,088 |

**Monticello Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table G
Monticello Nuclear Generating Plant
SAFSTOR Decommissioning Cost Estimate with DOE Pickup of Industry Fuel Starting in 2035
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|--|---|--------------|--------------|-----------------|-----------------|---------------------------|---------------------|---------------|-------------------|---------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|----------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| Detailed Work Procedures (continued) | | | | | | | | | | | | | | | | | | | | | | |
| 3b.1.1.13 | Moisture separators & reheaters | - | - | - | - | - | - | 257 | 39 | 296 | 296 | - | - | - | - | - | - | - | - | - | 2,000 | |
| 3b.1.1.14 | Radwaste building | - | - | - | - | - | - | 351 | 53 | 403 | 363 | - | 40 | - | - | - | - | - | - | - | 2,730 | |
| 3b.1.1.15 | Reactor building | - | - | - | - | - | - | 351 | 53 | 403 | 363 | - | 40 | - | - | - | - | - | - | - | 2,730 | |
| 3b.1.1 | Total | - | - | - | - | - | - | 4,208 | 631 | 4,839 | 4,376 | - | 463 | - | - | - | - | - | - | - | 32,741 | |
| 3b.1 | Subtotal Period 3b Activity Costs | - | - | - | - | - | - | 4,208 | 631 | 4,839 | 4,376 | - | 463 | - | - | - | - | - | - | - | 32,741 | |
| Period 3b Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3b.3.1 | Decon equipment | 1,055 | - | - | - | - | - | - | 158 | 1,213 | 1,213 | - | - | - | - | - | - | - | - | - | - | |
| 3b.3.2 | DOC staff relocation expenses | - | - | - | - | - | - | 1,264 | 190 | 1,454 | 1,454 | - | - | - | - | - | - | - | - | - | - | |
| 3b.3.3 | Pipe cutting equipment | - | 1,200 | - | - | - | - | - | 180 | 1,380 | 1,380 | - | - | - | - | - | - | - | - | - | - | |
| 3b.3 | Subtotal Period 3b Collateral Costs | 1,055 | 1,200 | - | - | - | - | 1,264 | 528 | 4,047 | 4,047 | - | - | - | - | - | - | - | - | - | - | |
| Period 3b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3b.4.1 | Decon supplies | 39 | - | - | - | - | - | - | 10 | 48 | 48 | - | - | - | - | - | - | - | - | - | - | |
| 3b.4.2 | Insurance | - | - | - | - | - | - | 351 | 35 | 386 | 386 | - | - | - | - | - | - | - | - | - | - | |
| 3b.4.3 | Property taxes | - | - | - | - | - | - | 1,348 | 135 | 1,483 | 1,483 | - | - | - | - | - | - | - | - | - | - | |
| 3b.4.4 | Health physics supplies | - | 295 | - | - | - | - | - | 74 | 369 | 369 | - | - | - | - | - | - | - | - | - | - | |
| 3b.4.5 | Heavy equipment rental | - | 375 | - | - | - | - | - | 56 | 432 | 432 | - | - | - | - | - | - | - | - | - | - | |
| 3b.4.6 | Disposal of DAW generated | - | - | 6 | 3 | - | 24 | - | 7 | 40 | 40 | - | - | - | 290 | - | - | - | - | 5,802 | 9 | |
| 3b.4.7 | Plant energy budget | - | - | - | - | - | - | 906 | 136 | 1,042 | 1,042 | - | - | - | - | - | - | - | - | - | - | |
| 3b.4.8 | NRC Fees | - | - | - | - | - | - | 167 | 17 | 183 | 183 | - | - | - | - | - | - | - | - | - | - | |
| 3b.4.9 | Fixed Overhead | - | - | - | - | - | - | 1,305 | 196 | 1,500 | 1,500 | - | - | - | - | - | - | - | - | - | - | |
| 3b.4.10 | Railroad Track Maintenance | - | - | - | - | - | - | 62 | 9 | 72 | 72 | - | - | - | - | - | - | - | - | - | - | |
| 3b.4.11 | Security Staff Cost | - | - | - | - | - | - | 2,214 | 332 | 2,546 | 2,546 | - | - | - | - | - | - | - | - | - | 32,411 | |
| 3b.4.12 | DOC Staff Cost | - | - | - | - | - | - | 5,344 | 802 | 6,146 | 6,146 | - | - | - | - | - | - | - | - | - | 58,080 | |
| 3b.4.13 | Utility Staff Cost | - | - | - | - | - | - | 8,274 | 1,241 | 9,516 | 9,516 | - | - | - | - | - | - | - | - | - | 128,607 | |
| 3b.4 | Subtotal Period 3b Period-Dependent Costs | 39 | 670 | 6 | 3 | - | 24 | 19,971 | 3,049 | 23,762 | 23,762 | - | - | - | 290 | - | - | - | - | 5,802 | 9 | 219,098 |
| 3b.0 | TOTAL PERIOD 3b COST | 1,093 | 1,870 | 6 | 3 | - | 24 | 25,443 | 4,208 | 32,647 | 32,185 | - | 463 | - | 290 | - | - | - | - | 5,802 | 9 | 251,839 |
| PERIOD 3 TOTALS | | 1,093 | 3,161 | 44 | 37 | 14 | 66 | 77,081 | 12,928 | 94,424 | 93,375 | - | 1,049 | 43 | 804 | - | - | - | - | 21,343 | 30,688 | 667,574 |
| PERIOD 4a - Large Component Removal | | | | | | | | | | | | | | | | | | | | | | |
| Period 4a Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Nuclear Steam Supply System Removal | | | | | | | | | | | | | | | | | | | | | | |
| 4a.1.1.1 | Recirculation System Piping & Valves | 23 | 85 | 27 | 32 | 185 | 264 | - | 134 | 750 | 750 | - | - | 676 | 715 | - | - | - | - | 94,867 | 1,594 | - |
| 4a.1.1.2 | Recirculation Pumps & Motors | 8 | 56 | 16 | 37 | 252 | 270 | - | 131 | 771 | 771 | - | - | 568 | 473 | - | - | - | - | 112,200 | 1,049 | - |
| 4a.1.1.3 | CRDMs & NIs Removal | 41 | 801 | 415 | 98 | - | 1,130 | - | 560 | 3,045 | 3,045 | - | - | - | 3,741 | - | - | - | - | 213,700 | 12,506 | - |
| 4a.1.1.4 | Reactor Vessel Internals | 139 | 6,098 | 8,236 | 1,029 | - | 25,657 | 278 | 19,830 | 61,268 | 61,268 | - | - | - | 2,943 | 1,628 | 600 | - | - | 337,343 | 22,415 | 1,055 |
| 4a.1.1.5 | Vessel & Internals GTCC Disposal | - | - | - | - | - | 4,313 | - | 647 | 4,960 | 4,960 | - | - | - | - | - | - | 1,160 | - | 225,765 | - | - |
| 4a.1.1.6 | Reactor Vessel | - | 8,498 | 1,818 | 837 | - | 6,301 | 278 | 10,229 | 27,961 | 27,961 | - | - | - | 17,823 | - | - | - | - | 1,110,260 | 22,415 | 1,055 |
| 4a.1.1 | Totals | 211 | 15,538 | 10,512 | 2,034 | 438 | 37,935 | 557 | 31,530 | 98,755 | 98,755 | - | - | 1,244 | 25,695 | 1,628 | 600 | 1,160 | - | 2,094,136 | 59,979 | 2,110 |
| Removal of Major Equipment | | | | | | | | | | | | | | | | | | | | | | |
| 4a.1.2 | Main Turbine/Generator | - | 340 | 1,356 | 521 | 6,139 | 439 | - | 1,330 | 10,126 | 10,126 | - | - | 24,835 | 1,383 | - | - | - | - | 1,577,959 | 4,796 | - |
| 4a.1.3 | Main Condensers | - | 1,207 | 360 | 194 | 3,225 | 244 | - | 912 | 6,142 | 6,142 | - | - | 17,396 | 727 | - | - | - | - | 828,955 | 16,823 | - |
| Cascading Costs from Clean Building Demolition | | | | | | | | | | | | | | | | | | | | | | |
| 4a.1.4.1 | Reactor Building | - | 332 | - | - | - | - | - | 50 | 381 | 381 | - | - | - | - | - | - | - | - | - | 2,217 | - |
| 4a.1.4.2 | Radwaste | - | 25 | - | - | - | - | - | 4 | 28 | 28 | - | - | - | - | - | - | - | - | - | 127 | - |
| 4a.1.4.3 | Turbine | - | 127 | - | - | - | - | - | 19 | 146 | 146 | - | - | - | - | - | - | - | - | - | 1,254 | - |
| 4a.1.4 | Totals | - | 483 | - | - | - | - | - | 72 | 556 | 556 | - | - | - | - | - | - | - | - | - | 3,598 | - |
| Disposal of Plant Systems | | | | | | | | | | | | | | | | | | | | | | |
| 4a.1.5.1 | Automatic Press Relief | - | 106 | 2 | 10 | 182 | - | - | 56 | 356 | 356 | - | - | 1,088 | - | - | - | - | - | 44,184 | 1,468 | - |
| 4a.1.5.2 | Chemistry Sampling | - | 24 | 0 | 2 | 35 | - | - | 12 | 73 | 73 | - | - | 207 | - | - | - | - | - | 8,422 | 356 | - |
| 4a.1.5.3 | Chemistry Sampling - Insulated | - | 2 | 0 | 0 | 0 | - | - | 0 | 2 | 2 | - | - | 1 | - | - | - | - | - | 61 | 25 | - |
| 4a.1.5.4 | Circulating Water - RCA | - | 207 | 14 | 62 | 1,114 | - | - | 230 | 1,626 | 1,626 | - | - | 6,656 | - | - | - | - | - | 270,307 | 2,860 | - |
| 4a.1.5.5 | Combustible Gas Control - Insul - RCA | - | 29 | 0 | 2 | 36 | - | - | 13 | 80 | 80 | - | - | 212 | - | - | - | - | - | 8,617 | 378 | - |
| 4a.1.5.6 | Combustible Gas Control - RCA | - | 18 | 1 | 3 | 48 | - | - | 12 | 81 | 81 | - | - | 285 | - | - | - | - | - | 11,577 | 245 | - |
| 4a.1.5.7 | Condensate & Feedwater | - | 888 | 60 | 281 | 5,046 | - | - | 1,027 | 7,303 | 7,303 | - | - | 30,157 | - | - | - | - | - | 1,224,704 | 12,501 | - |
| 4a.1.5.8 | Condensate & Feedwater - Insulated | - | 444 | 12 | 55 | 980 | - | - | 267 | 1,757 | 1,757 | - | - | 5,855 | - | - | - | - | - | 237,764 | 6,185 | - |
| 4a.1.5.9 | Condensate Demin | - | 494 | 9 | 44 | 792 | - | - | 250 | 1,590 | 1,590 | - | - | 4,735 | - | - | - | - | - | 192,293 | 6,784 | - |
| 4a.1.5.10 | Condensate Storage | - | 657 | 16 | 77 | 1,378 | - | - | 384 | 2,512 | 2,512 | - | - | 8,237 | - | - | - | - | - | 334,489 | 9,265 | - |
| 4a.1.5.11 | Control Rod Drive | - | 3 | 0 | 0 | 4 | - | - | 1 | 8 | 8 | - | - | 24 | - | - | - | - | - | 976 | 36 | - |

**Monticello Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table G
Monticello Nuclear Generating Plant
SAFSTOR Decommissioning Cost Estimate with DOE Pickup of Industry Fuel Starting in 2035
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---------------------------------------|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| Disposal of Plant Systems (continued) | | | | | | | | | | | | | | | | | | | | | |
| 4a.1.5.12 | Control Rod Drive Hydraulic | - | 374 | 5 | 23 | 408 | - | - | 159 | 968 | 968 | - | - | 2,440 | - | - | - | - | 99,094 | 5,255 | - |
| 4a.1.5.13 | Core Spray | - | 71 | 10 | 48 | 855 | - | - | 154 | 1,138 | 1,138 | - | - | 5,109 | - | - | - | - | 207,487 | 1,026 | - |
| 4a.1.5.14 | Core Spray - Insulated | - | 131 | 2 | 11 | 198 | - | - | 64 | 407 | 407 | - | - | 1,184 | - | - | - | - | 48,081 | 1,806 | - |
| 4a.1.5.15 | Demin Water - Insulated - RCA | - | 15 | 0 | 1 | 14 | - | - | 6 | 36 | 36 | - | - | 85 | - | - | - | - | 3,445 | 181 | - |
| 4a.1.5.16 | Demin Water - RCA | - | 41 | 1 | 2 | 42 | - | - | 17 | 104 | 104 | - | - | 253 | - | - | - | - | 10,278 | 508 | - |
| 4a.1.5.17 | Diesel Oil - RCA | - | 2 | 0 | 0 | 4 | - | - | 1 | 7 | 7 | - | - | 23 | - | - | - | - | 931 | 25 | - |
| 4a.1.5.18 | Drywell Atmosphere Cooling - RCA | - | 38 | 1 | 5 | 92 | - | - | 24 | 159 | 159 | - | - | 548 | - | - | - | - | 22,244 | 550 | - |
| 4a.1.5.19 | EDG Emerg Service Water - Insul - RCA | - | 0 | 0 | 0 | 0 | - | - | 0 | 1 | 1 | - | - | 2 | - | - | - | - | 84 | 4 | - |
| 4a.1.5.20 | Electrical - Clean | - | 13 | - | - | - | - | - | 2 | 15 | - | - | 15 | - | - | - | - | - | - | 182 | - |
| 4a.1.5.21 | Emergency Service Water - Insul - RCA | - | 21 | 0 | 1 | 23 | - | - | 9 | 55 | 55 | - | - | 137 | - | - | - | - | 5,544 | 281 | - |
| 4a.1.5.22 | Emergency Service Water - RCA | - | 2 | 0 | 0 | 2 | - | - | 1 | 5 | 5 | - | - | 13 | - | - | - | - | 512 | 22 | - |
| 4a.1.5.23 | GEZIP - RCA | - | 3 | 0 | 1 | 17 | - | - | 4 | 25 | 25 | - | - | 103 | - | - | - | - | 4,184 | 48 | - |
| 4a.1.5.24 | Generator Physical Design - RCA | - | 5 | 0 | 0 | 5 | - | - | 2 | 12 | 12 | - | - | 31 | - | - | - | - | 1,250 | 67 | - |
| 4a.1.5.25 | H2-O2 Control Analyzing | - | 6 | 0 | 0 | 4 | - | - | 2 | 12 | 12 | - | - | 23 | - | - | - | - | 948 | 72 | - |
| 4a.1.5.26 | H2-O2 Control Analyzing - Insulated | - | 6 | 0 | 0 | 4 | - | - | 2 | 12 | 12 | - | - | 23 | - | - | - | - | 948 | 72 | - |
| 4a.1.5.27 | High Pressure Coolant Injection | - | 60 | 3 | 12 | 211 | - | - | 49 | 334 | 334 | - | - | 1,262 | - | - | - | - | 51,257 | 850 | - |
| 4a.1.5.28 | High Pressure Coolant Injection - Insula | - | 198 | 4 | 21 | 379 | - | - | 110 | 713 | 713 | - | - | 2,266 | - | - | - | - | 92,018 | 2,734 | - |
| 4a.1.5.29 | Hydrogen Cooling | - | 8 | - | - | - | - | - | 1 | 10 | - | - | 10 | - | - | - | - | - | - | 118 | - |
| 4a.1.5.30 | Hydrogen Cooling - RCA | - | 7 | 0 | 0 | 7 | - | - | 3 | 17 | 17 | - | - | 39 | - | - | - | - | 1,600 | 79 | - |
| 4a.1.5.31 | Hydrogen Seal Oil - RCA | - | 17 | 0 | 2 | 32 | - | - | 9 | 60 | 60 | - | - | 189 | - | - | - | - | 7,669 | 212 | - |
| 4a.1.5.32 | Hydrogen Water Chemistry - RCA | - | 24 | 0 | 1 | 23 | - | - | 10 | 59 | 59 | - | - | 140 | - | - | - | - | 5,672 | 304 | - |
| 4a.1.5.33 | Instrument & Service Air - RCA | - | 225 | 4 | 17 | 296 | - | - | 103 | 644 | 644 | - | - | 1,768 | - | - | - | - | 71,810 | 2,733 | - |
| 4a.1.5.34 | Main Condenser | - | 177 | 4 | 18 | 318 | - | - | 95 | 613 | 613 | - | - | 1,903 | - | - | - | - | 77,301 | 2,443 | - |
| 4a.1.5.35 | Main Steam | - | 225 | 6 | 28 | 498 | - | - | 136 | 892 | 892 | - | - | 2,975 | - | - | - | - | 120,806 | 3,122 | - |
| 4a.1.5.36 | Main Turbine | - | 909 | 63 | 298 | 5,335 | - | - | 1,079 | 7,684 | 7,684 | - | - | 31,885 | - | - | - | - | 1,294,866 | 12,952 | - |
| 4a.1.5.37 | Main Turbine - Insulated | - | 193 | 7 | 32 | 579 | - | - | 141 | 952 | 952 | - | - | 3,460 | - | - | - | - | 140,506 | 2,725 | - |
| 4a.1.5.38 | Miscellaneous | - | 38 | 1 | 3 | 51 | - | - | 18 | 110 | 110 | - | - | 302 | - | - | - | - | 12,283 | 556 | - |
| 4a.1.5.39 | Off Gas Recombiner | - | 169 | 6 | 27 | 479 | - | - | 119 | 799 | 799 | - | - | 2,861 | - | - | - | - | 116,194 | 2,387 | - |
| 4a.1.5.40 | Off Gas Recombiner - Insulated | - | 351 | 5 | 22 | 393 | - | - | 150 | 921 | 921 | - | - | 2,350 | - | - | - | - | 95,441 | 4,785 | - |
| 4a.1.5.41 | Post Accident Sampling | - | 23 | 0 | 1 | 16 | - | - | 8 | 48 | 48 | - | - | 99 | - | - | - | - | 4,004 | 306 | - |
| 4a.1.5.42 | Post Accident Sampling - Insulated | - | 15 | 0 | 1 | 11 | - | - | 6 | 33 | 33 | - | - | 67 | - | - | - | - | 2,737 | 190 | - |
| 4a.1.5.43 | RHR Service Water - Insulated - RCA | - | 83 | 3 | 14 | 248 | - | - | 60 | 409 | 409 | - | - | 1,485 | - | - | - | - | 60,293 | 1,125 | - |
| 4a.1.5.44 | RHR Service Water - RCA | - | 4 | 0 | 0 | 6 | - | - | 2 | 12 | 12 | - | - | 35 | - | - | - | - | 1,410 | 57 | - |
| 4a.1.5.45 | Reactor Feedwater Pump Seal | - | 50 | 1 | 3 | 55 | - | - | 21 | 130 | 130 | - | - | 327 | - | - | - | - | 13,295 | 687 | - |
| 4a.1.5.46 | Residual Heat Removal | - | 226 | 58 | 147 | 2,110 | 514 | - | 529 | 3,584 | 3,584 | - | - | 12,609 | 1,519 | - | - | - | 609,174 | 3,282 | - |
| 4a.1.5.47 | Residual Heat Removal - Insulated | - | 500 | 39 | 74 | 851 | 464 | - | 384 | 2,312 | 2,312 | - | - | 5,084 | 1,374 | - | - | - | 294,206 | 7,027 | - |
| 4a.1.5.48 | Rx Core Isolation Cooling | - | 43 | 1 | 3 | 61 | - | - | 21 | 129 | 129 | - | - | 364 | - | - | - | - | 14,781 | 609 | - |
| 4a.1.5.49 | Rx Core Isolation Cooling - Insulated | - | 97 | 1 | 5 | 94 | - | - | 39 | 237 | 237 | - | - | 563 | - | - | - | - | 22,843 | 1,315 | - |
| 4a.1.5.50 | Rx Recirculation | - | 53 | 5 | 4 | 16 | 52 | - | 30 | 161 | 161 | - | - | 96 | 152 | - | - | - | 13,794 | 691 | - |
| 4a.1.5.51 | Snubbers | - | 151 | 1 | 5 | 84 | - | - | 51 | 292 | 292 | - | - | 502 | - | - | - | - | 20,395 | 2,272 | - |
| 4a.1.5.52 | Standby Liquid Control - Insul - RCA | - | 4 | 0 | 0 | 4 | - | - | 2 | 9 | 9 | - | - | 22 | - | - | - | - | 904 | 48 | - |
| 4a.1.5.53 | Standby Liquid Control - RCA | - | 26 | 1 | 2 | 41 | - | - | 13 | 83 | 83 | - | - | 245 | - | - | - | - | 9,969 | 341 | - |
| 4a.1.5.54 | Stator Cooling - RCA | - | 7 | 0 | 1 | 21 | - | - | 5 | 35 | 35 | - | - | 126 | - | - | - | - | 5,135 | 98 | - |
| 4a.1.5.55 | Traversing Incore Probe | - | 3 | 0 | 0 | 0 | 2 | - | 1 | 7 | 7 | - | - | 2 | 5 | - | - | - | 379 | 46 | - |
| 4a.1.5 | Totals | - | 7,490 | 347 | 1,370 | 23,501 | 1,032 | - | 5,894 | 39,634 | 39,610 | - | 24 | 140,459 | 3,050 | - | - | - | 5,899,167 | 104,297 | - |
| 4a.1.6 | Scaffolding in support of decommissioning | - | 2,106 | 22 | 12 | 191 | 31 | - | 567 | 2,929 | 2,929 | - | - | 1,030 | 91 | - | - | - | 52,111 | 19,968 | - |
| 4a.1 | Subtotal Period 4a Activity Costs | 211 | 27,165 | 12,598 | 4,132 | 33,494 | 39,680 | 557 | 40,305 | 158,142 | 158,117 | - | 24 | 184,963 | 30,945 | 1,628 | 600 | 1,160 | 10,452,330 | 209,462 | 2,110 |
| Period 4a Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 4a.3.1 | Process decommissioning water waste | 4 | - | 7 | 12 | - | 28 | - | 12 | 63 | 63 | - | - | - | 64 | - | - | - | 3,856 | 13 | - |
| 4a.3.3 | Small tool allowance | - | 267 | - | - | - | - | - | 40 | 307 | 276 | - | 31 | - | - | - | - | - | - | - | - |
| 4a.3 | Subtotal Period 4a Collateral Costs | 4 | 267 | 7 | 12 | - | 28 | - | 52 | 370 | 339 | - | 31 | - | 64 | - | - | - | 3,856 | 13 | - |
| Period 4a Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 4a.4.1 | Decon supplies | 87 | - | - | - | - | - | - | 22 | 109 | 109 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.2 | Insurance | - | - | - | - | - | - | - | 79 | 869 | 869 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.3 | Property taxes | - | - | - | - | - | - | 2,995 | 299 | 3,294 | 3,294 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.4 | Health physics supplies | - | 1,871 | - | - | - | - | - | 468 | 2,339 | 2,339 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.5 | Heavy equipment rental | - | 2,811 | - | - | - | - | - | 422 | 3,232 | 3,232 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.6 | Disposal of DAW generated | - | - | 89 | 46 | - | 369 | - | 108 | 612 | 612 | - | - | - | 4,484 | - | - | - | 89,676 | 146 | - |
| 4a.4.7 | Plant energy budget | - | - | - | - | - | - | 1,938 | 291 | 2,229 | 2,229 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.8 | NRC Fees | - | - | - | - | - | - | 544 | 54 | 598 | 598 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.9 | Fixed Overhead | - | - | - | - | - | - | 2,380 | 357 | 2,737 | 2,737 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.10 | Liquid Radwaste Processing Equipment/Services | - | - | - | - | - | - | 477 | 72 | 549 | 549 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.11 | Railroad Track Maintenance | - | - | - | - | - | - | 140 | 21 | 162 | 162 | - | - | - | - | - | - | - | - | - | - |

**Monticello Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table G
Monticello Nuclear Generating Plant
SAFSTOR Decommissioning Cost Estimate with DOE Pickup of Industry Fuel Starting in 2035
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|--|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|---------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| Period 4a Period-Dependent Costs (continued) | | | | | | | | | | | | | | | | | | | | | | |
| 4a.4.12 | Remedial Actions Surveys | - | - | - | - | - | - | 1,258 | 189 | 1,447 | 1,447 | - | - | - | - | - | - | - | - | - | - | - |
| 4a.4.13 | Security Staff Cost | - | - | - | - | - | - | 4,988 | 748 | 5,736 | 5,736 | - | - | - | - | - | - | - | - | - | 73,014 | |
| 4a.4.14 | DOC Staff Cost | - | - | - | - | - | - | 14,604 | 2,191 | 16,795 | 16,795 | - | - | - | - | - | - | - | - | - | 161,214 | |
| 4a.4.15 | Utility Staff Cost | - | - | - | - | - | - | 18,891 | 2,834 | 21,725 | 21,725 | - | - | - | - | - | - | - | - | - | 292,055 | |
| 4a.4 | Subtotal Period 4a Period-Dependent Costs | 87 | 4,682 | 89 | 46 | - | - | 49,006 | 8,154 | 62,433 | 62,433 | - | - | - | 4,484 | - | - | - | - | 89,676 | 146 | 526,283 |
| 4a.0 | TOTAL PERIOD 4a COST | 302 | 32,113 | 12,694 | 4,190 | 33,494 | 40,078 | 49,563 | 48,510 | 220,944 | 220,889 | - | 55 | 184,963 | 35,493 | 1,628 | 600 | 1,160 | 10,545,860 | 209,621 | 528,393 | |
| PERIOD 4b - Site Decontamination | | | | | | | | | | | | | | | | | | | | | | |
| Period 4b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| 4b.1.1 | Remove spent fuel racks | 591 | 58 | 103 | 149 | - | 2,572 | - | 986 | 4,459 | 4,459 | - | - | - | 7,653 | - | - | - | - | 486,170 | 906 | - |
| Disposal of Plant Systems | | | | | | | | | | | | | | | | | | | | | | |
| 4b.1.2.1 | ALARA/Radiological | - | 16 | 0 | 0 | 8 | - | - | 5 | 30 | 30 | - | - | 49 | - | - | - | - | - | 1,987 | 247 | - |
| 4b.1.2.2 | Alternate N2 - RCA | - | 16 | 0 | 1 | 16 | - | - | 7 | 40 | 40 | - | - | 93 | - | - | - | - | - | 3,765 | 185 | - |
| 4b.1.2.3 | Cranes/Heavy Loads/Rigging - RCA | - | 3 | 0 | 1 | 17 | - | - | 4 | 25 | 25 | - | - | 103 | - | - | - | - | - | 4,184 | 48 | - |
| 4b.1.2.4 | Decontamination Projects | - | 1 | 0 | 0 | 1 | - | - | 0 | 2 | 2 | - | - | 3 | - | - | - | - | - | 125 | 15 | - |
| 4b.1.2.5 | Electrical - Contaminated | - | 400 | 5 | 23 | 421 | - | - | 167 | 1,016 | 1,016 | - | - | 2,514 | - | - | - | - | - | 102,112 | 5,633 | - |
| 4b.1.2.6 | Electrical - Contaminated Fuel Pool | - | 42 | 1 | 2 | 42 | - | - | 17 | 105 | 105 | - | - | 253 | - | - | - | - | - | 10,272 | 592 | - |
| 4b.1.2.7 | Electrical - Decontam. Fuel Pool Area | - | 297 | 5 | 23 | 411 | - | - | 140 | 876 | 876 | - | - | 2,457 | - | - | - | - | - | 99,783 | 4,090 | - |
| 4b.1.2.8 | Electrical - Decontaminated | - | 2,698 | 48 | 218 | 3,906 | - | - | 1,298 | 8,167 | 8,167 | - | - | 23,344 | - | - | - | - | - | 948,013 | 37,107 | - |
| 4b.1.2.9 | Fire - RCA | - | 101 | 1 | 6 | 103 | - | - | 42 | 253 | 253 | - | - | 614 | - | - | - | - | - | 24,917 | 1,324 | - |
| 4b.1.2.10 | Fire - RCA - Fuel Pool Area | - | 11 | 0 | 1 | 10 | - | - | 4 | 26 | 26 | - | - | 62 | - | - | - | - | - | 2,499 | 143 | - |
| 4b.1.2.11 | Fuel Pool Cooling & Cleanup | - | 387 | 20 | 33 | 343 | 241 | - | 216 | 1,241 | 1,241 | - | - | 2,051 | 712 | - | - | - | - | 128,918 | 5,363 | - |
| 4b.1.2.12 | Fuel Pool Cooling & Cleanup - Insulated | - | 37 | 2 | 3 | 22 | 24 | - | 19 | 107 | 107 | - | - | 130 | 71 | - | - | - | - | 9,830 | 514 | - |
| 4b.1.2.13 | HVAC Ductwork | - | 276 | 6 | 26 | 469 | - | - | 144 | 921 | 921 | - | - | 2,805 | - | - | - | - | - | 113,913 | 3,539 | - |
| 4b.1.2.14 | HVAC Ductwork - Fuel Pool Area | - | 31 | 1 | 3 | 52 | - | - | 16 | 102 | 102 | - | - | 312 | - | - | - | - | - | 12,657 | 393 | - |
| 4b.1.2.15 | HVAC/Chilled Water - RCA | - | 324 | 6 | 26 | 461 | - | - | 155 | 971 | 971 | - | - | 2,752 | - | - | - | - | - | 111,779 | 3,985 | - |
| 4b.1.2.16 | HVAC/Chilled Water - RCA Fuel Pool Area | - | 33 | 0 | 2 | 37 | - | - | 14 | 87 | 87 | - | - | 223 | - | - | - | - | - | 9,072 | 397 | - |
| 4b.1.2.17 | Heating & Ventilation | - | 433 | 13 | 59 | 1,060 | - | - | 277 | 1,842 | 1,842 | - | - | 6,334 | - | - | - | - | - | 257,243 | 6,340 | - |
| 4b.1.2.18 | Heating Boiler - Insulated - RCA | - | 3 | 0 | 0 | 4 | - | - | 1 | 9 | 9 | - | - | 26 | - | - | - | - | - | 1,058 | 35 | - |
| 4b.1.2.19 | Instrument & Service Air-RCA-Fuel Pool | - | 29 | 1 | 2 | 45 | - | - | 14 | 91 | 91 | - | - | 267 | - | - | - | - | - | 10,841 | 357 | - |
| 4b.1.2.20 | Liquid Radwaste | - | 621 | 31 | 57 | 703 | 311 | - | 350 | 2,072 | 2,072 | - | - | 4,203 | 915 | - | - | - | - | 229,422 | 8,550 | - |
| 4b.1.2.21 | Makeup Demin - RCA | - | 103 | 3 | 14 | 246 | - | - | 65 | 431 | 431 | - | - | 1,471 | - | - | - | - | - | 59,747 | 1,412 | - |
| 4b.1.2.22 | Non-Essential Diesel Generator - RCA | - | 27 | 3 | 13 | 238 | - | - | 45 | 327 | 327 | - | - | 1,424 | - | - | - | - | - | 57,832 | 395 | - |
| 4b.1.2.23 | Off Gas Holdup | - | 310 | 7 | 34 | 607 | - | - | 174 | 1,133 | 1,133 | - | - | 3,629 | - | - | - | - | - | 147,355 | 4,256 | - |
| 4b.1.2.24 | Primary Containment | - | 411 | 16 | 77 | 1,389 | - | - | 324 | 2,218 | 2,218 | - | - | 8,302 | - | - | - | - | - | 337,148 | 5,729 | - |
| 4b.1.2.25 | Process Radiation Monitors | - | 41 | 0 | 2 | 36 | - | - | 16 | 95 | 95 | - | - | 213 | - | - | - | - | - | 8,667 | 577 | - |
| 4b.1.2.26 | Rx Bldg Closed Cng Water - Insul - RCA | - | 114 | 2 | 9 | 163 | - | - | 54 | 343 | 343 | - | - | 977 | - | - | - | - | - | 39,675 | 1,484 | - |
| 4b.1.2.27 | Rx Bldg Closed Cng Water - RCA | - | 184 | 15 | 66 | 1,187 | - | - | 235 | 1,687 | 1,687 | - | - | 7,093 | - | - | - | - | - | 288,031 | 2,489 | - |
| 4b.1.2.28 | Rx Component Handling Equip | - | 127 | 11 | 24 | 291 | 139 | - | 115 | 708 | 708 | - | - | 1,737 | 415 | - | - | - | - | 96,901 | 1,839 | - |
| 4b.1.2.29 | Rx Pressure Vessel | - | 43 | 5 | 5 | 27 | 57 | - | 30 | 167 | 167 | - | - | 161 | 169 | - | - | - | - | 17,375 | 578 | - |
| 4b.1.2.30 | Rx Water Cleanup | - | 239 | 16 | 15 | 47 | 214 | - | 124 | 655 | 655 | - | - | 278 | 630 | - | - | - | - | 51,819 | 3,264 | - |
| 4b.1.2.31 | Secondary Containment | - | 112 | 3 | 13 | 229 | - | - | 65 | 421 | 421 | - | - | 1,372 | - | - | - | - | - | 55,702 | 1,569 | - |
| 4b.1.2.32 | Service & Seal Water - Insulated - RCA | - | 120 | 2 | 11 | 197 | - | - | 62 | 392 | 392 | - | - | 1,180 | - | - | - | - | - | 47,917 | 1,565 | - |
| 4b.1.2.33 | Service & Seal Water - RCA | - | 159 | 4 | 17 | 303 | - | - | 88 | 570 | 570 | - | - | 1,809 | - | - | - | - | - | 73,453 | 2,016 | - |
| 4b.1.2.34 | Service Air Blower - RCA | - | 15 | 0 | 2 | 34 | - | - | 9 | 62 | 62 | - | - | 206 | - | - | - | - | - | 8,364 | 206 | - |
| 4b.1.2.35 | Solid Radwaste | - | 446 | 21 | 45 | 567 | 223 | - | 261 | 1,563 | 1,563 | - | - | 3,390 | 659 | - | - | - | - | 179,772 | 6,270 | - |
| 4b.1.2.36 | Structures & Buildings | - | 70 | 1 | 4 | 80 | - | - | 30 | 185 | 185 | - | - | 477 | - | - | - | - | - | 19,351 | 1,005 | - |
| 4b.1.2.37 | Wells & Domestic Water | - | 10 | - | - | - | - | - | 1 | 11 | - | - | 11 | - | - | - | - | - | - | - | 144 | - |
| 4b.1.2.38 | Wells & Domestic Water - RCA | - | 52 | 1 | 3 | 57 | - | - | 22 | 136 | 136 | - | - | 342 | - | - | - | - | - | 13,874 | 633 | - |
| 4b.1.2 | Totals | - | 8,342 | 249 | 841 | 13,829 | 1,210 | - | 4,613 | 29,085 | 29,073 | - | 11 | 82,654 | 3,571 | - | - | - | - | 3,585,374 | 114,290 | - |
| 4b.1.3 | Scaffolding in support of decommissioning | - | 3,159 | 33 | 19 | 286 | 46 | - | 850 | 4,394 | 4,394 | - | - | 1,545 | 136 | - | - | - | - | 78,166 | 29,953 | - |
| Decontamination of Site Buildings | | | | | | | | | | | | | | | | | | | | | | |
| 4b.1.4.1 | Reactor Building | 4,668 | 2,596 | 178 | 516 | 8,044 | 1,181 | - | 4,580 | 21,764 | 21,764 | - | - | 48,077 | 7,014 | - | - | - | - | 2,317,670 | 100,718 | - |
| 4b.1.4.2 | Admin | 96 | 5 | 0 | 3 | - | 15 | - | 53 | 172 | 172 | - | - | - | 145 | - | - | - | - | 6,840 | 1,421 | - |
| 4b.1.4.3 | HPCI Room | 26 | 25 | 1 | 3 | 20 | 14 | - | 26 | 115 | 115 | - | - | 118 | 125 | - | - | - | - | 10,759 | 703 | - |
| 4b.1.4.4 | Hot Shop | 15 | 4 | 0 | 2 | - | 11 | - | 11 | 43 | 43 | - | - | - | 103 | - | - | - | - | 4,860 | 254 | - |
| 4b.1.4.5 | LLRW Storage & Shipping | 52 | 22 | 2 | 8 | 5 | 45 | - | 45 | 179 | 179 | - | - | 31 | 433 | - | - | - | - | 21,708 | 1,003 | - |
| 4b.1.4.6 | Offgas Stack | 336 | 241 | 7 | 23 | 225 | 82 | - | 286 | 1,199 | 1,199 | - | - | 1,343 | 669 | - | - | - | - | 87,045 | 7,924 | - |
| 4b.1.4.7 | Offgas Storage & Compressor | 36 | 15 | 1 | 6 | 4 | 33 | - | 32 | 128 | 128 | - | - | 25 | 316 | - | - | - | - | 15,948 | 696 | - |
| 4b.1.4.8 | Radwaste | 109 | 54 | 3 | 17 | 29 | 96 | - | 100 | 410 | 410 | - | - | 172 | 910 | - | - | - | - | 49,943 | 2,229 | - |
| 4b.1.4.9 | Radwaste Material Storage Warehouse | 57 | 21 | 2 | 9 | - | 52 | - | 48 | 189 | 189 | - | - | - | 495 | - | - | - | - | 23,400 | 1,062 | - |
| 4b.1.4.10 | Recombiner | 24 | 22 | 1 | 5 | 33 | 24 | - | 30 | 140 | 140 | - | - | 199 | 216 | - | - | - | - | 18,405 | 616 | - |

**Monticello Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table G
Monticello Nuclear Generating Plant
SAFSTOR Decommissioning Cost Estimate with DOE Pickup of Industry Fuel Starting in 2035
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|---------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| Decontamination of Site Buildings (continued) | | | | | | | | | | | | | | | | | | | | | | |
| 4b.1.4.11 | Turbine | 638 | 314 | 21 | 104 | 215 | 564 | - | 588 | 2,444 | 2,444 | - | - | 1,283 | 5,299 | - | - | - | - | 303,150 | 12,856 | - |
| 4b.1.4.12 | Turbine Building Addition | 53 | 19 | 1 | 8 | - | 45 | - | 44 | 169 | 169 | - | - | - | 434 | - | - | - | - | 20,478 | 968 | - |
| 4b.1.4.13 | Reactor (Post Fuel) | 849 | 2,325 | 172 | 913 | 329 | 5,301 | - | 2,535 | 12,425 | 12,425 | - | - | 1,969 | 50,605 | - | - | - | - | 2,471,778 | 40,860 | - |
| 4b.1.4 | Totals | 6,960 | 5,663 | 390 | 1,617 | 8,904 | 7,465 | - | 8,379 | 39,378 | 39,378 | - | - | 53,216 | 66,764 | - | - | - | - | 5,351,984 | 171,309 | - |
| 4b.1.5 | Prepare/submit License Termination Plan | - | - | - | - | - | - | 526 | 79 | 605 | 605 | - | - | - | - | - | - | - | - | - | - | 4,096 |
| 4b.1.6 | Receive NRC approval of termination plan | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - | - |
| 4b.1 | Subtotal Period 4b Activity Costs | 7,551 | 17,223 | 776 | 2,626 | 23,019 | 11,293 | 526 | 14,907 | 77,921 | 77,910 | - | 11 | 137,414 | 78,124 | - | - | - | - | 9,501,694 | 316,457 | 4,096 |
| Period 4b Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 4b.2.1 | License Termination Survey Planning | - | - | - | - | - | - | 1,458 | 437 | 1,896 | 1,896 | - | - | - | - | - | - | - | - | - | - | 12,480 |
| 4b.2.2 | Excavation of Underground Services | - | 1,972 | - | - | - | - | 376 | 550 | 2,898 | 2,898 | - | - | - | - | - | - | - | - | - | 12,493 | - |
| 4b.2.3 | Operational Equipment | - | - | 23 | 92 | 1,211 | - | - | 198 | 1,524 | 1,524 | - | - | 11,760 | - | - | - | - | - | 294,000 | 32 | - |
| 4b.2.4 | License Termination ISFSI | - | 57 | 188 | 987 | - | 5,925 | 3,118 | 2,569 | 12,844 | 12,844 | - | - | - | 21,949 | - | - | - | - | 2,633,402 | 10,339 | 14,785 |
| 4b.2 | Subtotal Period 4b Additional Costs | - | 2,029 | 211 | 1,079 | 1,211 | 5,925 | 4,952 | 3,753 | 19,161 | 19,161 | - | - | 11,760 | 21,949 | - | - | - | - | 2,927,402 | 22,864 | 27,265 |
| Period 4b Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 4b.3.1 | Process decommissioning water waste | 12 | - | 22 | 39 | - | 88 | - | 36 | 196 | 196 | - | - | - | 202 | - | - | - | - | 12,097 | 39 | - |
| 4b.3.3 | Small tool allowance | - | 397 | - | - | - | - | - | 60 | 457 | 457 | - | - | - | - | - | - | - | - | - | - | - |
| 4b.3.4 | Decommissioning Equipment Disposition | - | - | 130 | 82 | 1,112 | 178 | - | 237 | 1,739 | 1,739 | - | - | 6,000 | 529 | - | - | - | - | 303,608 | 147 | - |
| 4b.3 | Subtotal Period 4b Collateral Costs | 12 | 397 | 152 | 121 | 1,112 | 266 | - | 332 | 2,392 | 2,392 | - | - | 6,000 | 731 | - | - | - | - | 315,705 | 186 | - |
| Period 4b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 4b.4.1 | Decon supplies | 1,701 | - | - | - | - | - | - | 425 | 2,126 | 2,126 | - | - | - | - | - | - | - | - | - | - | - |
| 4b.4.2 | Insurance | - | - | - | - | - | - | 1,434 | 143 | 1,577 | 1,577 | - | - | - | - | - | - | - | - | - | - | - |
| 4b.4.3 | Property taxes | - | - | - | - | - | - | 5,202 | 520 | 5,722 | 5,722 | - | - | - | - | - | - | - | - | - | - | - |
| 4b.4.4 | Health physics supplies | - | 3,107 | - | - | - | - | - | 777 | 3,884 | 3,884 | - | - | - | - | - | - | - | - | - | - | - |
| 4b.4.5 | Heavy equipment rental | - | 5,239 | - | - | - | - | - | 786 | 6,024 | 6,024 | - | - | - | - | - | - | - | - | - | - | - |
| 4b.4.6 | Disposal of DAW generated | - | - | 117 | 60 | - | 486 | - | 142 | 805 | 805 | - | - | - | 5,892 | - | - | - | - | 117,848 | 192 | - |
| 4b.4.7 | Plant energy budget | - | - | - | - | - | - | 2,777 | 417 | 3,194 | 3,194 | - | - | - | - | - | - | - | - | - | - | - |
| 4b.4.8 | NRC Fees | - | - | - | - | - | - | 986 | 99 | 1,085 | 1,085 | - | - | - | - | - | - | - | - | - | - | - |
| 4b.4.9 | Fixed Overhead | - | - | - | - | - | - | 4,319 | 648 | 4,967 | 4,967 | - | - | - | - | - | - | - | - | - | - | - |
| 4b.4.10 | Liquid Radwaste Processing Equipment/Services | - | - | - | - | - | - | 866 | 130 | 996 | 996 | - | - | - | - | - | - | - | - | - | - | - |
| 4b.4.11 | Railroad Track Maintenance | - | - | - | - | - | - | 255 | 38 | 293 | 293 | - | - | - | - | - | - | - | - | - | - | - |
| 4b.4.12 | Remedial Actions Surveys | - | - | - | - | - | - | 2,283 | 343 | 2,626 | 2,626 | - | - | - | - | - | - | - | - | - | - | - |
| 4b.4.13 | Security Staff Cost | - | - | - | - | - | - | 9,052 | 1,358 | 10,409 | 10,409 | - | - | - | - | - | - | - | - | - | - | 132,493 |
| 4b.4.14 | DOC Staff Cost | - | - | - | - | - | - | 25,916 | 3,887 | 29,803 | 29,803 | - | - | - | - | - | - | - | - | - | - | 284,065 |
| 4b.4.15 | Utility Staff Cost | - | - | - | - | - | - | 32,416 | 4,862 | 37,278 | 37,278 | - | - | - | - | - | - | - | - | - | - | 500,294 |
| 4b.4 | Subtotal Period 4b Period-Dependent Costs | 1,701 | 8,346 | 117 | 60 | - | 486 | 85,506 | 14,575 | 110,790 | 110,790 | - | - | - | 5,892 | - | - | - | - | 117,848 | 192 | 916,853 |
| 4b.0 | TOTAL PERIOD 4b COST | 9,264 | 27,996 | 1,255 | 3,886 | 25,343 | 17,969 | 90,984 | 33,567 | 210,264 | 210,253 | - | 11 | 155,174 | 106,697 | - | - | - | - | 12,862,650 | 339,700 | 948,214 |
| PERIOD 4f - License Termination | | | | | | | | | | | | | | | | | | | | | | |
| Period 4f Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| 4f.1.1 | ORISE confirmatory survey | - | - | - | - | - | - | 166 | 50 | 216 | 216 | - | - | - | - | - | - | - | - | - | - | - |
| 4f.1.2 | Terminate license | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - | - |
| 4f.1 | Subtotal Period 4f Activity Costs | - | - | - | - | - | - | 166 | 50 | 216 | 216 | - | - | - | - | - | - | - | - | - | - | - |
| Period 4f Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 4f.2.1 | License Termination Survey | - | - | - | - | - | - | 6,920 | 2,076 | 8,995 | 8,995 | - | - | - | - | - | - | - | - | - | 95,048 | 6,240 |
| 4f.2 | Subtotal Period 4f Additional Costs | - | - | - | - | - | - | 6,920 | 2,076 | 8,995 | 8,995 | - | - | - | - | - | - | - | - | - | 95,048 | 6,240 |
| Period 4f Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 4f.3.1 | DOC staff relocation expenses | - | - | - | - | - | - | 1,264 | 190 | 1,454 | 1,454 | - | - | - | - | - | - | - | - | - | - | - |
| 4f.3 | Subtotal Period 4f Collateral Costs | - | - | - | - | - | - | 1,264 | 190 | 1,454 | 1,454 | - | - | - | - | - | - | - | - | - | - | - |
| Period 4f Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 4f.4.2 | Property taxes | - | - | - | - | - | - | 1,796 | 180 | 1,975 | 1,975 | - | - | - | - | - | - | - | - | - | - | - |
| 4f.4.3 | Health physics supplies | - | 705 | - | - | - | - | - | 176 | 881 | 881 | - | - | - | - | - | - | - | - | - | - | - |
| 4f.4.4 | Disposal of DAW generated | - | - | 7 | 4 | - | 29 | - | 8 | 48 | 48 | - | - | - | 351 | - | - | - | - | 7,025 | 11 | - |
| 4f.4.5 | Plant energy budget | - | - | - | - | - | - | 274 | 41 | 315 | 315 | - | - | - | - | - | - | - | - | - | - | - |
| 4f.4.6 | NRC Fees | - | - | - | - | - | - | 426 | 43 | 468 | 468 | - | - | - | - | - | - | - | - | - | - | - |
| 4f.4.7 | Fixed Overhead | - | - | - | - | - | - | 1,597 | 239 | 1,836 | 1,836 | - | - | - | - | - | - | - | - | - | - | - |
| 4f.4.8 | Railroad Track Maintenance | - | - | - | - | - | - | 94 | 14 | 108 | 108 | - | - | - | - | - | - | - | - | - | - | - |
| 4f.4.9 | Security Staff Cost | - | - | - | - | - | - | 1,360 | 204 | 1,564 | 1,564 | - | - | - | - | - | - | - | - | - | - | 18,805 |

**Monticello Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table G
Monticello Nuclear Generating Plant
SAFSTOR Decommissioning Cost Estimate with DOE Pickup of Industry Fuel Starting in 2035
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|--|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|---------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| Period 4f Period-Dependent Costs (continued) | | | | | | | | | | | | | | | | | | | | | | |
| 4f.4.10 | DOC Staff Cost | - | - | - | - | - | - | 5,393 | 809 | 6,201 | 6,201 | - | - | - | - | - | - | - | - | - | 57,200 | |
| 4f.4.11 | Utility Staff Cost | - | - | - | - | - | - | 5,275 | 791 | 6,066 | 6,066 | - | - | - | - | - | - | - | - | - | 74,438 | |
| 4f.4 | Subtotal Period 4f Period-Dependent Costs | - | 705 | 7 | 4 | - | 29 | 16,214 | 2,506 | 19,463 | 19,463 | - | - | - | 351 | - | - | - | - | 7,025 | 11 | 150,444 |
| 4f.0 | TOTAL PERIOD 4f COST | - | 705 | 7 | 4 | - | 29 | 24,563 | 4,821 | 30,128 | 30,128 | - | - | - | 351 | - | - | - | - | 7,025 | 95,059 | 156,684 |
| PERIOD 4 TOTALS | | 9,566 | 60,813 | 13,956 | 8,079 | 58,837 | 58,076 | 165,111 | 86,898 | 461,337 | 461,270 | - | 66 | 340,138 | 142,540 | 1,628 | 600 | 1,160 | 23,415,530 | 644,379 | 1,633,290 | |
| PERIOD 5b - Site Restoration | | | | | | | | | | | | | | | | | | | | | | |
| Period 5b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Demolition of Remaining Site Buildings | | | | | | | | | | | | | | | | | | | | | | |
| 5b.1.1.1 | Reactor Building | - | 1,971 | - | - | - | - | - | 296 | 2,267 | - | - | 2,267 | - | - | - | - | - | - | - | 13,911 | - |
| 5b.1.1.2 | Condensate Tanks Foundation | - | 10 | - | - | - | - | - | 1 | 11 | - | - | 11 | - | - | - | - | - | - | - | 50 | - |
| 5b.1.1.3 | Discharge Retention Basin | - | 4 | - | - | - | - | - | 1 | 5 | - | - | 5 | - | - | - | - | - | - | - | 25 | - |
| 5b.1.1.4 | HPCI Room | - | 19 | - | - | - | - | - | 3 | 22 | - | - | 22 | - | - | - | - | - | - | - | 97 | - |
| 5b.1.1.5 | Hot Shop | - | 16 | - | - | - | - | - | 2 | 19 | - | - | 19 | - | - | - | - | - | - | - | 177 | - |
| 5b.1.1.6 | Hydrogen & Oxygen Storage | - | 2 | - | - | - | - | - | 0 | 2 | - | - | 2 | - | - | - | - | - | - | - | 19 | - |
| 5b.1.1.7 | LLRW Storage & Shipping | - | 83 | - | - | - | - | - | 12 | 95 | - | - | 95 | - | - | - | - | - | - | - | 662 | - |
| 5b.1.1.8 | MSIV | - | 4 | - | - | - | - | - | 1 | 4 | - | - | 4 | - | - | - | - | - | - | - | 42 | - |
| 5b.1.1.9 | Misc Structures 2017 | - | 1,410 | - | - | - | - | - | 212 | 1,622 | - | - | 1,622 | - | - | - | - | - | - | - | 13,042 | - |
| 5b.1.1.10 | Offgas Stack | - | 108 | - | - | - | - | - | 16 | 124 | - | - | 124 | - | - | - | - | - | - | - | 544 | - |
| 5b.1.1.11 | Offgas Storage & Compressor | - | 39 | - | - | - | - | - | 6 | 45 | - | - | 45 | - | - | - | - | - | - | - | 199 | - |
| 5b.1.1.12 | Radwaste | - | 228 | - | - | - | - | - | 34 | 262 | - | - | 262 | - | - | - | - | - | - | - | 1,220 | - |
| 5b.1.1.13 | Recombiner | - | 128 | - | - | - | - | - | 19 | 147 | - | - | 147 | - | - | - | - | - | - | - | 713 | - |
| 5b.1.1.14 | Security Barrier | - | 186 | - | - | - | - | - | 28 | 214 | - | - | 214 | - | - | - | - | - | - | - | 933 | - |
| 5b.1.1.15 | Structures Greater than 3' Below Grade | - | 2,461 | - | - | - | - | - | 369 | 2,830 | - | - | 2,830 | - | - | - | - | - | - | - | 12,649 | - |
| 5b.1.1.16 | Tank Farm | - | 4 | - | - | - | - | - | 1 | 5 | - | - | 5 | - | - | - | - | - | - | - | 21 | - |
| 5b.1.1.17 | Turbine | - | 1,259 | - | - | - | - | - | 189 | 1,448 | - | - | 1,448 | - | - | - | - | - | - | - | 13,036 | - |
| 5b.1.1.18 | Turbine Building Addition | - | 55 | - | - | - | - | - | 8 | 63 | - | - | 63 | - | - | - | - | - | - | - | 618 | - |
| 5b.1.1.19 | Turbine Pedestal | - | 182 | - | - | - | - | - | 27 | 209 | - | - | 209 | - | - | - | - | - | - | - | 926 | - |
| 5b.1.1 | Totals | - | 8,169 | - | - | - | - | - | 1,225 | 9,394 | - | - | 9,394 | - | - | - | - | - | - | - | 58,885 | - |
| Site Closeout Activities | | | | | | | | | | | | | | | | | | | | | | |
| 5b.1.2 | Grade & landscape site | - | 896 | - | - | - | - | - | 134 | 1,031 | - | - | 1,031 | - | - | - | - | - | - | - | 1,841 | - |
| 5b.1.3 | Final report to NRC | - | - | - | - | - | - | 200 | 30 | 231 | 231 | - | - | - | - | - | - | - | - | - | - | 1,560 |
| 5b.1 | Subtotal Period 5b Activity Costs | - | 9,065 | - | - | - | - | 200 | 1,390 | 10,655 | 231 | - | 10,425 | - | - | - | - | - | - | - | 60,726 | 1,560 |
| Period 5b Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 5b.2.1 | Clean Concrete Disposal | - | 3,322 | - | - | - | - | 13 | 500 | 3,835 | - | - | 3,835 | - | - | - | - | - | - | - | 12 | - |
| 5b.2.2 | Intake Structure Cofferdam | - | 335 | - | - | - | - | - | 50 | 385 | - | - | 385 | - | - | - | - | - | - | - | 2,584 | - |
| 5b.2.3 | Construction Debris | - | - | - | - | - | - | 1,170 | 176 | 1,346 | - | - | 1,346 | - | - | - | - | - | - | - | - | - |
| 5b.2.4 | Backfill | - | 5,583 | - | - | - | - | - | 837 | 6,421 | - | - | 6,421 | - | - | - | - | - | - | - | 5,422 | - |
| 5b.2.5 | Discharge Structure Cofferdam | - | 442 | - | - | - | - | - | 66 | 508 | - | - | 508 | - | - | - | - | - | - | - | 3,552 | - |
| 5b.2.6 | Demolition and Site Restoration of ISFSI | - | 1,486 | - | - | - | - | 233 | 258 | 1,977 | - | - | 1,977 | - | - | - | - | - | - | - | 6,957 | 160 |
| 5b.2 | Subtotal Period 5b Additional Costs | - | 11,168 | - | - | - | - | 1,416 | 1,888 | 14,472 | - | - | 14,472 | - | - | - | - | - | - | - | 18,527 | 160 |
| Period 5b Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 5b.3.1 | Small tool allowance | - | 121 | - | - | - | - | - | 18 | 139 | - | - | 139 | - | - | - | - | - | - | - | - | - |
| 5b.3 | Subtotal Period 5b Collateral Costs | - | 121 | - | - | - | - | - | 18 | 139 | - | - | 139 | - | - | - | - | - | - | - | - | - |
| Period 5b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 5b.4.2 | Property taxes | - | - | - | - | - | - | 4,602 | 460 | 5,062 | - | - | 5,062 | - | - | - | - | - | - | - | - | - |
| 5b.4.3 | Heavy equipment rental | - | 5,842 | - | - | - | - | - | 876 | 6,719 | - | - | 6,719 | - | - | - | - | - | - | - | - | - |
| 5b.4.4 | Plant energy budget | - | - | - | - | - | - | 315 | 47 | 362 | - | - | 362 | - | - | - | - | - | - | - | - | - |
| 5b.4.5 | Fixed Overhead | - | - | - | - | - | - | 1,122 | 168 | 1,290 | - | - | 1,290 | - | - | - | - | - | - | - | - | - |
| 5b.4.6 | Railroad Track Maintenance | - | - | - | - | - | - | 217 | 33 | 249 | - | - | 249 | - | - | - | - | - | - | - | - | - |
| 5b.4.7 | Security Staff Cost | - | - | - | - | - | - | 3,131 | 470 | 3,601 | - | - | 3,601 | - | - | - | - | - | - | - | - | 43,287 |
| 5b.4.8 | DOC Staff Cost | - | - | - | - | - | - | 11,729 | 1,759 | 13,489 | - | - | 13,489 | - | - | - | - | - | - | - | - | 122,646 |
| 5b.4.9 | Utility Staff Cost | - | - | - | - | - | - | 4,931 | 740 | 5,671 | - | - | 5,671 | - | - | - | - | - | - | - | - | 70,341 |
| 5b.4 | Subtotal Period 5b Period-Dependent Costs | - | 5,842 | - | - | - | - | 26,047 | 4,553 | 36,443 | - | - | 36,443 | - | - | - | - | - | - | - | - | 236,274 |
| 5b.0 | TOTAL PERIOD 5b COST | - | 26,196 | - | - | - | - | 27,664 | 7,849 | 61,709 | 231 | - | 61,478 | - | - | - | - | - | - | - | 79,253 | 237,994 |

**Monticello Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table G
Monticello Nuclear Generating Plant
SAFSTOR Decommissioning Cost Estimate with DOE Pickup of Industry Fuel Starting in 2035
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|-----------------------------------|----------------------|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|---------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| PERIOD 5 TOTALS | | - | 26,196 | - | - | - | - | 27,664 | 7,849 | 61,709 | 231 | - | 61,478 | - | - | - | - | - | - | - | 79,253 | 237,994 |
| TOTAL COST TO DECOMMISSION | | 21,259 | 100,203 | 14,399 | 8,640 | 58,852 | 59,775 | 1,282,791 | 255,109 | 1,801,028 | 1,258,686 | 479,749 | 62,593 | 340,180 | 153,105 | 1,628 | 600 | 1,160 | 23,725,930 | 876,199 | 9,098,058 | |

| | |
|--|--|
| TOTAL COST TO DECOMMISSION WITH 16.5% CONTINGENCY: | \$1,801,028 thousands of 2020 dollars |
| TOTAL NRC LICENSE TERMINATION COST IS 69.89% OR: | \$1,258,686 thousands of 2020 dollars |
| SPENT FUEL MANAGEMENT COST IS 26.64% OR: | \$479,749 thousands of 2020 dollars |
| NON-NUCLEAR DEMOLITION COST IS 3.48% OR: | \$62,593 thousands of 2020 dollars |
| TOTAL LOW-LEVEL RADIOACTIVE WASTE VOLUME BURIED (EXCLUDING GTCC): | 155,332 Cubic Feet |
| TOTAL GREATER THAN CLASS C RADWASTE VOLUME GENERATED: | 1,160 Cubic Feet |
| TOTAL SCRAP METAL REMOVED: | 23,123 Tons |
| TOTAL CRAFT LABOR REQUIREMENTS: | 876,199 Man-hours |

End Notes:
n/a - indicates that this activity not charged as decommissioning expense
a - indicates that this activity performed by decommissioning staff
0 - indicates that this value is less than 0.5 but is non-zero
A cell containing " - " indicates a zero value

***Monticello Nuclear Generating Plant
Decommissioning Cost Analysis***

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APPENDIX H

DETAILED COST ANALYSIS

SCENARIO 6: SAFSTOR with 60 Year DFS

**Monticello Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table H
Monticello Nuclear Generating Plant
SAFSTOR Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|--|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| PERIOD 1a - Shutdown through Transition | | | | | | | | | | | | | | | | | | | | | |
| Period 1a Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| 1a.1.1 | SAFSTOR site characterization survey | - | - | - | - | - | - | 415 | 124 | 539 | 539 | - | - | - | - | - | - | - | - | - | - |
| 1a.1.2 | Prepare preliminary decommissioning cost | - | - | - | - | - | - | 167 | 25 | 192 | 192 | - | - | - | - | - | - | - | - | - | 1,300 |
| 1a.1.3 | Notification of Cessation of Operations | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.4 | Remove fuel & source material | - | - | - | - | - | - | - | - | n/a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.5 | Notification of Permanent Defueling | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.6 | Deactivate plant systems & process waste | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.7 | Prepare and submit PSDAR | - | - | - | - | - | - | 257 | 39 | 296 | 296 | - | - | - | - | - | - | - | - | - | 2,000 |
| 1a.1.8 | Review plant dwgs & specs. | - | - | - | - | - | - | 167 | 25 | 192 | 192 | - | - | - | - | - | - | - | - | - | 1,300 |
| 1a.1.9 | Perform detailed rad survey | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.10 | Estimate by-product inventory | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| 1a.1.11 | End product description | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| 1a.1.12 | Detailed by-product inventory | - | - | - | - | - | - | 193 | 29 | 222 | 222 | - | - | - | - | - | - | - | - | - | 1,500 |
| 1a.1.13 | Define major work sequence | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| 1a.1.14 | Perform SER and EA | - | - | - | - | - | - | 398 | 60 | 458 | 458 | - | - | - | - | - | - | - | - | - | 3,100 |
| 1a.1.15 | Perform Site-Specific Cost Study | - | - | - | - | - | - | 643 | 96 | 739 | 739 | - | - | - | - | - | - | - | - | - | 5,000 |
| Activity Specifications | | | | | | | | | | | | | | | | | | | | | |
| 1a.1.16.1 | Prepare plant and facilities for SAFSTOR | - | - | - | - | - | - | 632 | 95 | 727 | 727 | - | - | - | - | - | - | - | - | - | 4,920 |
| 1a.1.16.2 | Plant systems | - | - | - | - | - | - | 536 | 80 | 616 | 616 | - | - | - | - | - | - | - | - | - | 4,167 |
| 1a.1.16.3 | Plant structures and buildings | - | - | - | - | - | - | 401 | 60 | 461 | 461 | - | - | - | - | - | - | - | - | - | 3,120 |
| 1a.1.16.4 | Waste management | - | - | - | - | - | - | 257 | 39 | 296 | 296 | - | - | - | - | - | - | - | - | - | 2,000 |
| 1a.1.16.5 | Facility and site dormancy | - | - | - | - | - | - | 257 | 39 | 296 | 296 | - | - | - | - | - | - | - | - | - | 2,000 |
| 1a.1.16 | Total | - | - | - | - | - | - | 2,083 | 312 | 2,395 | 2,395 | - | - | - | - | - | - | - | - | - | 16,207 |
| Detailed Work Procedures | | | | | | | | | | | | | | | | | | | | | |
| 1a.1.17.1 | Plant systems | - | - | - | - | - | - | 152 | 23 | 175 | 175 | - | - | - | - | - | - | - | - | - | 1,183 |
| 1a.1.17.2 | Facility closeout & dormancy | - | - | - | - | - | - | 154 | 23 | 177 | 177 | - | - | - | - | - | - | - | - | - | 1,200 |
| 1a.1.17 | Total | - | - | - | - | - | - | 306 | 46 | 352 | 352 | - | - | - | - | - | - | - | - | - | 2,383 |
| 1a.1.18 | Procure vacuum drying system | - | - | - | - | - | - | 13 | 2 | 15 | 15 | - | - | - | - | - | - | - | - | - | 100 |
| 1a.1.19 | Drain/de-energize non-cont. systems | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.20 | Drain & dry NSSS | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.21 | Drain/de-energize contaminated systems | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.22 | Decon/secure contaminated systems | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1 | Subtotal Period 1a Activity Costs | - | - | - | - | - | - | 5,027 | 816 | 5,844 | 5,844 | - | - | - | - | - | - | - | - | - | 35,890 |
| Period 1a Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 1a.3.1 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 1,323 | 198 | 1,522 | - | 1,522 | - | - | - | - | - | - | - | - | - |
| 1a.3.2 | Retention and Severance | - | - | - | - | - | - | 9,892 | 1,484 | 11,376 | 11,376 | - | - | - | - | - | - | - | - | - | - |
| 1a.3 | Subtotal Period 1a Collateral Costs | - | - | - | - | - | - | 11,215 | 1,682 | 12,897 | 11,376 | 1,522 | - | - | - | - | - | - | - | - | - |
| Period 1a Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 1a.4.1 | Insurance | - | - | - | - | - | - | 2,328 | 233 | 2,561 | 2,561 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.2 | Property taxes | - | - | - | - | - | - | 3,570 | 357 | 3,927 | 3,927 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.3 | Health physics supplies | - | 614 | - | - | - | - | - | 153 | 767 | 767 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.4 | Heavy equipment rental | - | 753 | - | - | - | - | - | 113 | 866 | 866 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.5 | Disposal of DAW generated | - | - | 12 | 6 | - | 50 | - | 15 | 83 | 83 | - | - | - | 610 | - | - | - | 12,190 | 20 | - |
| 1a.4.6 | Plant energy budget | - | - | - | - | - | - | 1,817 | 272 | 2,089 | 2,089 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.7 | NRC Fees | - | - | - | - | - | - | 892 | 89 | 981 | 981 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.8 | Emergency Planning Fees | - | - | - | - | - | - | 3,428 | 343 | 3,770 | - | 3,770 | - | - | - | - | - | - | - | - | - |
| 1a.4.9 | Fixed Overhead | - | - | - | - | - | - | 2,616 | 392 | 3,009 | 3,009 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.10 | Spent Fuel Pool O&M | - | - | - | - | - | - | 845 | 127 | 971 | - | 971 | - | - | - | - | - | - | - | - | - |
| 1a.4.11 | ISFSI Operating Costs | - | - | - | - | - | - | 112 | 17 | 129 | - | 129 | - | - | - | - | - | - | - | - | - |
| 1a.4.12 | Railroad Track Maintenance | - | - | - | - | - | - | 125 | 19 | 144 | 144 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.13 | Security Staff Cost | - | - | - | - | - | - | 16,372 | 2,456 | 18,827 | 18,827 | - | - | - | - | - | - | - | - | - | 245,440 |
| 1a.4.14 | Utility Staff Cost | - | - | - | - | - | - | 27,285 | 4,093 | 31,378 | 31,378 | - | - | - | - | - | - | - | - | - | 422,240 |
| 1a.4 | Subtotal Period 1a Period-Dependent Costs | - | 1,367 | 12 | 6 | - | 50 | 59,389 | 8,679 | 69,502 | 64,632 | 4,870 | - | - | 610 | - | - | - | 12,190 | 20 | 667,680 |
| 1a.0 | TOTAL PERIOD 1a COST | - | 1,367 | 12 | 6 | - | 50 | 75,631 | 11,177 | 88,244 | 81,852 | 6,392 | - | - | 610 | - | - | - | 12,190 | 20 | 703,570 |

**Monticello Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table H
Monticello Nuclear Generating Plant
SAFSTOR Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|--|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|---------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| PERIOD 1b - SAFSTOR Limited DECON Activities | | | | | | | | | | | | | | | | | | | | | | |
| Period 1b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Decontamination of Site Buildings | | | | | | | | | | | | | | | | | | | | | | |
| 1b.1.1.1 | Reactor Building | 5,155 | - | - | - | - | - | - | 2,577 | 7,732 | 7,732 | - | - | - | - | - | - | - | - | - | 70,157 | - |
| 1b.1.1.2 | Admin | 106 | - | - | - | - | - | - | 53 | 159 | 159 | - | - | - | - | - | - | - | - | - | 1,526 | - |
| 1b.1.1.3 | HPCI Room | 28 | - | - | - | - | - | - | 14 | 42 | 42 | - | - | - | - | - | - | - | - | - | 391 | - |
| 1b.1.1.4 | Hot Shop | 16 | - | - | - | - | - | - | 8 | 24 | 24 | - | - | - | - | - | - | - | - | - | 234 | - |
| 1b.1.1.5 | LLRW Storage & Shipping | 54 | - | - | - | - | - | - | 27 | 82 | 82 | - | - | - | - | - | - | - | - | - | 788 | - |
| 1b.1.1.6 | Offgas Stack | 362 | - | - | - | - | - | - | 181 | 542 | 542 | - | - | - | - | - | - | - | - | - | 5,112 | - |
| 1b.1.1.7 | Offgas Storage & Compressor | 38 | - | - | - | - | - | - | 19 | 57 | 57 | - | - | - | - | - | - | - | - | - | 550 | - |
| 1b.1.1.8 | Radwaste | 114 | - | - | - | - | - | - | 57 | 171 | 171 | - | - | - | - | - | - | - | - | - | 1,647 | - |
| 1b.1.1.9 | Radwaste Material Storage Warehouse | 60 | - | - | - | - | - | - | 30 | 90 | 90 | - | - | - | - | - | - | - | - | - | 864 | - |
| 1b.1.1.10 | Recombiner | 25 | - | - | - | - | - | - | 13 | 38 | 38 | - | - | - | - | - | - | - | - | - | 363 | - |
| 1b.1.1.11 | Turbine | 664 | - | - | - | - | - | - | 332 | 996 | 996 | - | - | - | - | - | - | - | - | - | 9,600 | - |
| 1b.1.1.12 | Turbine Building Addition | 55 | - | - | - | - | - | - | 27 | 82 | 82 | - | - | - | - | - | - | - | - | - | 793 | - |
| 1b.1.1.13 | Reactor (Post Fuel) | 924 | - | - | - | - | - | - | 462 | 1,386 | 1,386 | - | - | - | - | - | - | - | - | - | 12,653 | - |
| 1b.1.1 | Totals | 7,601 | - | - | - | - | - | - | 3,800 | 11,401 | 11,401 | - | - | - | - | - | - | - | - | - | 104,679 | - |
| 1b.1 | Subtotal Period 1b Activity Costs | 7,601 | - | - | - | - | - | - | 3,800 | 11,401 | 11,401 | - | - | - | - | - | - | - | - | - | 104,679 | - |
| Period 1b Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 1b.2.1 | Spent Fuel Pool Isolation | - | - | - | - | - | - | 12,675 | 1,901 | 14,576 | 14,576 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.2 | Subtotal Period 1b Additional Costs | - | - | - | - | - | - | 12,675 | 1,901 | 14,576 | 14,576 | - | - | - | - | - | - | - | - | - | - | - |
| Period 1b Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 1b.3.1 | Decon equipment | 1,055 | - | - | - | - | - | - | 158 | 1,213 | 1,213 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.3.2 | Process decommissioning water waste | 220 | - | 146 | 259 | - | 589 | - | 310 | 1,523 | 1,523 | - | - | - | 1,352 | - | - | - | - | - | 81,127 | 264 |
| 1b.3.4 | Small tool allowance | - | 130 | - | - | - | - | - | 20 | 150 | 150 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.3.5 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 196 | 29 | 225 | - | 225 | - | - | - | - | - | - | - | - | - | - |
| 1b.3.6 | Retention and Severance | - | - | - | - | - | - | 3,601 | 540 | 4,141 | 4,141 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.3 | Subtotal Period 1b Collateral Costs | 1,275 | 130 | 146 | 259 | - | 589 | 3,796 | 1,058 | 7,252 | 7,027 | 225 | - | - | 1,352 | - | - | - | - | - | 81,127 | 264 |
| Period 1b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 1b.4.1 | Decon supplies | 1,562 | - | - | - | - | - | - | 391 | 1,953 | 1,953 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.2 | Insurance | - | - | - | - | - | - | 580 | 58 | 638 | 638 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.3 | Property taxes | - | - | - | - | - | - | 890 | 89 | 979 | 979 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.4 | Health physics supplies | - | 750 | - | - | - | - | - | 187 | 937 | 937 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.5 | Heavy equipment rental | - | 188 | - | - | - | - | - | 28 | 216 | 216 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.6 | Disposal of DAW generated | - | - | 12 | 6 | - | 48 | - | 14 | 80 | 80 | - | - | - | 588 | - | - | - | - | - | 11,769 | 19 |
| 1b.4.7 | Plant energy budget | - | - | - | - | - | - | 453 | 68 | 521 | 521 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.8 | NRC Fees | - | - | - | - | - | - | 161 | 16 | 177 | 177 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.9 | Emergency Planning Fees | - | - | - | - | - | - | 708 | 71 | 779 | - | 779 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.10 | Fixed Overhead | - | - | - | - | - | - | 652 | 98 | 750 | 750 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.11 | Spent Fuel Pool O&M | - | - | - | - | - | - | 211 | 32 | 242 | - | 242 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.12 | ISFSI Operating Costs | - | - | - | - | - | - | 28 | 4 | 32 | - | 32 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.13 | Railroad Track Maintenance | - | - | - | - | - | - | 31 | 5 | 36 | 36 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.14 | Security Staff Cost | - | - | - | - | - | - | 4,082 | 612 | 4,694 | 4,694 | - | - | - | - | - | - | - | - | - | - | 61,192 |
| 1b.4.15 | Utility Staff Cost | - | - | - | - | - | - | 6,803 | 1,020 | 7,823 | 7,823 | - | - | - | - | - | - | - | - | - | - | 105,271 |
| 1b.4 | Subtotal Period 1b Period-Dependent Costs | 1,562 | 938 | 12 | 6 | - | 48 | 14,599 | 2,693 | 19,858 | 18,805 | 1,053 | - | - | 588 | - | - | - | - | - | 11,769 | 19 |
| 1b.0 | TOTAL PERIOD 1b COST | 10,438 | 1,068 | 157 | 265 | - | 637 | 31,070 | 9,453 | 53,088 | 51,810 | 1,278 | - | - | 1,941 | - | - | - | - | - | 92,896 | 104,962 |
| PERIOD 1c - Preparations for SAFSTOR Dormancy | | | | | | | | | | | | | | | | | | | | | | |
| Period 1c Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| 1c.1.1 | Prepare support equipment for storage | - | 527 | - | - | - | - | - | 79 | 606 | 606 | - | - | - | - | - | - | - | - | - | 3,000 | - |
| 1c.1.2 | Install containment pressure equal. lines | - | 54 | - | - | - | - | - | 8 | 62 | 62 | - | - | - | - | - | - | - | - | - | 700 | - |
| 1c.1.3 | Interim survey prior to dormancy | - | - | - | - | - | - | 733 | 220 | 953 | 953 | - | - | - | - | - | - | - | - | - | 12,801 | - |
| 1c.1.4 | Secure building accesses | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 1c.1.5 | Prepare & submit interim report | - | - | - | - | - | - | 75 | 11 | 86 | 86 | - | - | - | - | - | - | - | - | - | - | 583 |
| 1c.1 | Subtotal Period 1c Activity Costs | - | 581 | - | - | - | - | 808 | 318 | 1,707 | 1,707 | - | - | - | - | - | - | - | - | - | 16,501 | 583 |

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**Table H
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SAFSTOR Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|---|---------------|--------------|-----------------|-----------------|---------------------------|---------------------|----------------|-------------------|----------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| Period 1c Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 1c.3.1 | Process decommissioning water waste | 161 | - | 107 | 190 | - | 433 | - | 228 | 1,120 | 1,120 | - | - | - | 994 | - | - | - | 59,653 | 194 | - |
| 1c.3.3 | Small tool allowance | - | 5 | - | - | - | - | - | 1 | 6 | 6 | - | - | - | - | - | - | - | - | - | - |
| 1c.3.4 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 195 | 29 | 225 | - | 225 | - | - | - | - | - | - | - | - | - |
| 1c.3.5 | Retention and Severance | - | - | - | - | - | - | 2,734 | 410 | 3,145 | 3,145 | - | - | - | - | - | - | - | - | - | - |
| 1c.3 | Subtotal Period 1c Collateral Costs | 161 | 5 | 107 | 190 | - | 433 | 2,930 | 668 | 4,495 | 4,270 | 225 | - | - | 994 | - | - | - | 59,653 | 194 | - |
| Period 1c Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 1c.4.1 | Insurance | - | - | - | - | - | - | 580 | 58 | 638 | 638 | - | - | - | - | - | - | - | - | - | - |
| 1c.4.2 | Property taxes | - | - | - | - | - | - | 888 | 89 | 977 | 977 | - | - | - | - | - | - | - | - | - | - |
| 1c.4.3 | Health physics supplies | - | 248 | - | - | - | - | - | 62 | 310 | 310 | - | - | - | - | - | - | - | - | - | - |
| 1c.4.4 | Heavy equipment rental | - | 188 | - | - | - | - | - | 28 | 216 | 216 | - | - | - | - | - | - | - | - | - | - |
| 1c.4.5 | Disposal of DAW generated | - | - | 3 | 2 | - | 13 | - | 4 | 21 | 21 | - | - | 152 | - | - | - | - | 3,039 | 5 | - |
| 1c.4.6 | Plant energy budget | - | - | - | - | - | - | 453 | 68 | 521 | 521 | - | - | - | - | - | - | - | - | - | - |
| 1c.4.7 | NRC Fees | - | - | - | - | - | - | 161 | 16 | 177 | 177 | - | - | - | - | - | - | - | - | - | - |
| 1c.4.8 | Emergency Planning Fees | - | - | - | - | - | - | 708 | 71 | 779 | - | 779 | - | - | - | - | - | - | - | - | - |
| 1c.4.9 | Fixed Overhead | - | - | - | - | - | - | 652 | 98 | 750 | 750 | - | - | - | - | - | - | - | - | - | - |
| 1c.4.10 | Spent Fuel Pool O&M | - | - | - | - | - | - | 211 | 32 | 242 | - | 242 | - | - | - | - | - | - | - | - | - |
| 1c.4.11 | ISFSI Operating Costs | - | - | - | - | - | - | 28 | 4 | 32 | - | 32 | - | - | - | - | - | - | - | - | - |
| 1c.4.12 | Railroad Track Maintenance | - | - | - | - | - | - | 31 | 5 | 36 | 36 | - | - | - | - | - | - | - | - | - | - |
| 1c.4.13 | Security Staff Cost | - | - | - | - | - | - | 4,082 | 612 | 4,694 | 4,694 | - | - | - | - | - | - | - | - | - | 61,192 |
| 1c.4.14 | Utility Staff Cost | - | - | - | - | - | - | 6,803 | 1,020 | 7,823 | 7,823 | - | - | - | - | - | - | - | - | - | 105,271 |
| 1c.4 | Subtotal Period 1c Period-Dependent Costs | - | 436 | 3 | 2 | - | 13 | 14,597 | 2,166 | 17,216 | 16,163 | 1,053 | - | - | 152 | - | - | - | 3,039 | 5 | 166,463 |
| 1c.0 | TOTAL PERIOD 1c COST | 161 | 1,021 | 110 | 192 | - | 446 | 18,335 | 3,153 | 23,418 | 22,140 | 1,278 | - | - | 1,146 | - | - | - | 62,692 | 16,700 | 167,046 |
| PERIOD 1 TOTALS | | 10,599 | 3,456 | 279 | 463 | - | 1,133 | 125,036 | 23,783 | 164,750 | 155,802 | 8,948 | - | - | 3,696 | - | - | - | 167,779 | 121,681 | 1,037,079 |
| PERIOD 2a - SAFSTOR Dormancy with Wet Spent Fuel Storage | | | | | | | | | | | | | | | | | | | | | |
| Period 2a Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| 2a.1.1 | Quarterly Inspection | - | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - |
| 2a.1.2 | Semi-annual environmental survey | - | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - |
| 2a.1.3 | Prepare reports | - | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - |
| 2a.1.4 | Bituminous roof replacement | - | - | - | - | - | - | 155 | 23 | 178 | 178 | - | - | - | - | - | - | - | - | - | - |
| 2a.1.5 | Maintenance supplies | - | - | - | - | - | - | 349 | 87 | 437 | 437 | - | - | - | - | - | - | - | - | - | - |
| 2a.1 | Subtotal Period 2a Activity Costs | - | - | - | - | - | - | 504 | 111 | 615 | 615 | - | - | - | - | - | - | - | - | - | - |
| Period 2a Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 2a.2.1 | Security Modifications | - | - | - | - | - | - | 8,696 | 1,304 | 10,000 | 10,000 | - | - | - | - | - | - | - | - | - | - |
| 2a.2 | Subtotal Period 2a Additional Costs | - | - | - | - | - | - | 8,696 | 1,304 | 10,000 | 10,000 | - | - | - | - | - | - | - | - | - | - |
| Period 2a Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 2a.3.1 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 130,915 | 19,637 | 150,553 | - | 150,553 | - | - | - | - | - | - | - | - | - |
| 2a.3.2 | Retention and Severance | - | - | - | - | - | - | 19,427 | 2,914 | 22,341 | 22,341 | - | - | - | - | - | - | - | - | - | - |
| 2a.3 | Subtotal Period 2a Collateral Costs | - | - | - | - | - | - | 150,342 | 22,551 | 172,893 | 22,341 | 150,553 | - | - | - | - | - | - | - | - | - |
| Period 2a Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 2a.4.1 | Insurance | - | - | - | - | - | - | 1,761 | 176 | 1,937 | 1,937 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.2 | Property taxes | - | - | - | - | - | - | 8,932 | 893 | 9,825 | 9,825 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.3 | Health physics supplies | - | 617 | - | - | - | - | - | 154 | 771 | 771 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.4 | Disposal of DAW generated | - | - | 11 | 6 | - | 47 | - | 14 | 79 | 79 | - | - | 576 | - | - | - | - | 11,523 | 19 | - |
| 2a.4.5 | Plant energy budget | - | - | - | - | - | - | 910 | 136 | 1,046 | 1,046 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.6 | NRC Fees | - | - | - | - | - | - | 610 | 61 | 671 | 671 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.7 | Emergency Planning Fees | - | - | - | - | - | - | 7,110 | 711 | 7,821 | - | 7,821 | - | - | - | - | - | - | - | - | - |
| 2a.4.8 | Fixed Overhead | - | - | - | - | - | - | 5,306 | 796 | 6,102 | 6,102 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.9 | Spent Fuel Pool O&M | - | - | - | - | - | - | 2,115 | 317 | 2,432 | - | 2,432 | - | - | - | - | - | - | - | - | - |
| 2a.4.10 | ISFSI Operating Costs | - | - | - | - | - | - | 280 | 42 | 322 | - | 322 | - | - | - | - | - | - | - | - | - |
| 2a.4.11 | Railroad Track Maintenance | - | - | - | - | - | - | 639 | 96 | 735 | 735 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.12 | Security Staff Cost | - | - | - | - | - | - | 37,806 | 5,671 | 43,477 | 31,086 | 12,391 | - | - | - | - | - | - | - | - | 562,523 |
| 2a.4.13 | Utility Staff Cost | - | - | - | - | - | - | 13,543 | 2,031 | 15,574 | 12,615 | 2,959 | - | - | - | - | - | - | - | - | 205,738 |
| 2a.4 | Subtotal Period 2a Period-Dependent Costs | - | 617 | 11 | 6 | - | 47 | 79,012 | 11,099 | 90,793 | 64,868 | 25,925 | - | - | 576 | - | - | - | 11,523 | 19 | 768,261 |
| 2a.0 | TOTAL PERIOD 2a COST | - | 617 | 11 | 6 | - | 47 | 238,554 | 35,065 | 274,301 | 97,823 | 176,478 | - | - | 576 | - | - | - | 11,523 | 19 | 768,261 |

**Monticello Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table H
Monticello Nuclear Generating Plant
SAFSTOR Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|--|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| PERIOD 2b - SAFSTOR Dormancy with Dry Spent Fuel Storage | | | | | | | | | | | | | | | | | | | | | |
| Period 2b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| 2b.1.1 | Quarterly Inspection | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 2b.1.2 | Semi-annual environmental survey | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 2b.1.3 | Prepare reports | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 2b.1.4 | Bituminous roof replacement | - | - | - | - | - | - | 3,127 | 469 | 3,596 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.1.5 | Maintenance supplies | - | - | - | - | - | - | 7,065 | 1,766 | 8,831 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.1 | Subtotal Period 2b Activity Costs | - | - | - | - | - | - | 10,192 | 2,235 | 12,427 | - | - | - | - | - | - | - | - | - | - | - |
| Period 2b Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 2b.3.1 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 73,422 | 11,013 | 84,435 | - | 84,435 | - | - | - | - | - | - | - | - | - |
| 2b.3 | Subtotal Period 2b Collateral Costs | - | - | - | - | - | - | 73,422 | 11,013 | 84,435 | - | 84,435 | - | - | - | - | - | - | - | - | - |
| Period 2b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 2b.4.1 | Insurance | - | - | - | - | - | - | 35,606 | 3,561 | 39,167 | 39,167 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.2 | Property taxes | - | - | - | - | - | - | 180,613 | 18,061 | 198,674 | 198,674 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.3 | Health physics supplies | - | 6,047 | - | - | - | - | - | 1,512 | 7,559 | 7,559 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.4 | Disposal of DAW generated | - | - | 111 | 57 | - | 461 | - | 135 | 764 | 764 | - | - | 5,595 | - | - | - | - | 111,903 | 182 | - |
| 2b.4.5 | Plant energy budget | - | - | - | - | - | - | 9,196 | 1,379 | 10,576 | 10,576 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.6 | NRC Fees | - | - | - | - | - | - | 11,515 | 1,152 | 12,667 | 12,667 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.7 | Emergency Planning Fees | - | - | - | - | - | - | 7,506 | 751 | 8,256 | - | 8,256 | - | - | - | - | - | - | - | - | - |
| 2b.4.8 | Fixed Overhead | - | - | - | - | - | - | 10,904 | 1,636 | 12,540 | 12,540 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.9 | ISFSI Operating Costs | - | - | - | - | - | - | 5,666 | 850 | 6,516 | - | 6,516 | - | - | - | - | - | - | - | - | - |
| 2b.4.10 | Railroad Track Maintenance | - | - | - | - | - | - | 6,330 | 950 | 7,280 | 7,280 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.11 | Security Staff Cost | - | - | - | - | - | - | 280,802 | 42,120 | 322,922 | 72,658 | 250,265 | - | - | - | - | - | - | - | - | 3,790,775 |
| 2b.4.12 | Utility Staff Cost | - | - | - | - | - | - | 114,547 | 17,182 | 131,729 | 71,924 | 59,805 | - | - | - | - | - | - | - | - | 1,684,789 |
| 2b.4 | Subtotal Period 2b Period-Dependent Costs | - | 6,047 | 111 | 57 | - | 461 | 662,686 | 89,288 | 758,650 | 433,808 | 324,843 | - | - | 5,595 | - | - | - | 111,903 | 182 | 5,475,563 |
| 2b.0 | TOTAL PERIOD 2b COST | - | 6,047 | 111 | 57 | - | 461 | 746,299 | 102,536 | 855,512 | 446,234 | 409,278 | - | - | 5,595 | - | - | - | 111,903 | 182 | 5,475,563 |
| PERIOD 2 TOTALS | | - | 6,664 | 122 | 63 | - | 509 | 984,854 | 137,602 | 1,129,813 | 544,057 | 585,756 | - | - | 6,171 | - | - | - | 123,426 | 201 | 6,243,824 |
| PERIOD 3a - Reactivate Site Following SAFSTOR Dormancy | | | | | | | | | | | | | | | | | | | | | |
| Period 3a Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| 3a.1.1 | Prepare preliminary decommissioning cost | - | - | - | - | - | - | 167 | 25 | 192 | 192 | - | - | - | - | - | - | - | - | - | 1,300 |
| 3a.1.2 | Review plant dwgs & specs. | - | - | - | - | - | - | 591 | 89 | 680 | 680 | - | - | - | - | - | - | - | - | - | 4,600 |
| 3a.1.3 | Perform detailed rad survey | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 3a.1.4 | End product description | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| 3a.1.5 | Detailed by-product inventory | - | - | - | - | - | - | 167 | 25 | 192 | 192 | - | - | - | - | - | - | - | - | - | 1,300 |
| 3a.1.6 | Define major work sequence | - | - | - | - | - | - | 964 | 145 | 1,108 | 1,108 | - | - | - | - | - | - | - | - | - | 7,500 |
| 3a.1.7 | Perform SER and EA | - | - | - | - | - | - | 398 | 60 | 458 | 458 | - | - | - | - | - | - | - | - | - | 3,100 |
| 3a.1.8 | Prepare/submit Defueled Technical Specifications | - | - | - | - | - | - | 964 | 145 | 1,108 | 1,108 | - | - | - | - | - | - | - | - | - | 7,500 |
| 3a.1.9 | Perform Site-Specific Cost Study | - | - | - | - | - | - | 643 | 96 | 739 | 739 | - | - | - | - | - | - | - | - | - | 5,000 |
| 3a.1.10 | Prepare/submit Irradiated Fuel Management Plan | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| Activity Specifications | | | | | | | | | | | | | | | | | | | | | |
| 3a.1.11.1 | Re-activate plant & temporary facilities | - | - | - | - | - | - | 947 | 142 | 1,089 | 980 | - | 109 | - | - | - | - | - | - | - | 7,370 |
| 3a.1.11.2 | Plant systems | - | - | - | - | - | - | 536 | 80 | 616 | 554 | - | 62 | - | - | - | - | - | - | - | 4,167 |
| 3a.1.11.3 | Reactor internals | - | - | - | - | - | - | 912 | 137 | 1,049 | 1,049 | - | - | - | - | - | - | - | - | - | 7,100 |
| 3a.1.11.4 | Reactor vessel | - | - | - | - | - | - | 835 | 125 | 961 | 961 | - | - | - | - | - | - | - | - | - | 6,500 |
| 3a.1.11.5 | Sacrificial shield | - | - | - | - | - | - | 64 | 10 | 74 | 74 | - | - | - | - | - | - | - | - | - | 500 |
| 3a.1.11.6 | Moisture separators/reheaters | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| 3a.1.11.7 | Reinforced concrete | - | - | - | - | - | - | 206 | 31 | 236 | 118 | - | 118 | - | - | - | - | - | - | - | 1,600 |
| 3a.1.11.8 | Main Turbine | - | - | - | - | - | - | 268 | 40 | 309 | 309 | - | - | - | - | - | - | - | - | - | 2,088 |
| 3a.1.11.9 | Main Condensers | - | - | - | - | - | - | 268 | 40 | 309 | 309 | - | - | - | - | - | - | - | - | - | 2,088 |
| 3a.1.11.10 | Pressure suppression structure | - | - | - | - | - | - | 257 | 39 | 296 | 296 | - | - | - | - | - | - | - | - | - | 2,000 |
| 3a.1.11.11 | Drywell | - | - | - | - | - | - | 206 | 31 | 236 | 236 | - | - | - | - | - | - | - | - | - | 1,600 |
| 3a.1.11.12 | Plant structures & buildings | - | - | - | - | - | - | 401 | 60 | 461 | 231 | - | 231 | - | - | - | - | - | - | - | 3,120 |
| 3a.1.11.13 | Waste management | - | - | - | - | - | - | 591 | 89 | 680 | 680 | - | - | - | - | - | - | - | - | - | 4,600 |
| 3a.1.11.14 | Facility & site closeout | - | - | - | - | - | - | 116 | 17 | 133 | 67 | - | 67 | - | - | - | - | - | - | - | 900 |
| 3a.1.11 | Total | - | - | - | - | - | - | 5,736 | 860 | 6,597 | 6,011 | - | 586 | - | - | - | - | - | - | - | 44,633 |
| Planning & Site Preparations | | | | | | | | | | | | | | | | | | | | | |
| 3a.1.12 | Prepare dismantling sequence | - | - | - | - | - | - | 308 | 46 | 355 | 355 | - | - | - | - | - | - | - | - | - | 2,400 |
| 3a.1.13 | Plant prep. & temp. svces | - | - | - | - | - | - | 3,500 | 525 | 4,025 | 4,025 | - | - | - | - | - | - | - | - | - | - |
| 3a.1.14 | Design water clean-up system | - | - | - | - | - | - | 180 | 27 | 207 | 207 | - | - | - | - | - | - | - | - | - | 1,400 |

**Monticello Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table H
Monticello Nuclear Generating Plant
SAFSTOR Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| Planning & Site Preparations (continued) | | | | | | | | | | | | | | | | | | | | | |
| 3a.1.15 | Rigging/Cont. Cntrl Envlps/tooling/etc. | - | - | - | - | - | - | 2,400 | 360 | 2,760 | 2,760 | - | - | - | - | - | - | - | - | - | - |
| 3a.1.16 | Procure casks/liners & containers | - | - | - | - | - | - | 158 | 24 | 182 | 182 | - | - | - | - | - | - | - | - | - | 1,230 |
| 3a.1 | Subtotal Period 3a Activity Costs | - | - | - | - | - | - | 16,434 | 2,465 | 18,899 | 18,313 | - | 586 | - | - | - | - | - | - | - | 81,963 |
| Period 3a Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 3a.2.1 | Site Characterization | - | - | - | - | - | - | 5,930 | 1,779 | 7,708 | 7,708 | - | - | - | - | - | - | - | - | - | 30,500 |
| 3a.2.2 | Mixed & RCRA Waste | - | - | 28 | 29 | 14 | - | - | 9 | 80 | 80 | - | - | 43 | - | - | - | - | - | 5,253 | 161 |
| 3a.2 | Subtotal Period 3a Additional Costs | - | - | 28 | 29 | 14 | - | 5,930 | 1,788 | 7,788 | 7,788 | - | - | 43 | - | - | - | - | - | 5,253 | 30,661 |
| Period 3a Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 3a.3.1 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 1,805 | 271 | 2,076 | - | 2,076 | - | - | - | - | - | - | - | - | - |
| 3a.3 | Subtotal Period 3a Collateral Costs | - | - | - | - | - | - | 1,805 | 271 | 2,076 | - | 2,076 | - | - | - | - | - | - | - | - | - |
| Period 3a Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 3a.4.1 | Insurance | - | - | - | - | - | - | 703 | 70 | 774 | 442 | 332 | - | - | - | - | - | - | - | - | - |
| 3a.4.2 | Property taxes | - | - | - | - | - | - | 3,479 | 348 | 3,827 | 3,241 | 586 | - | - | - | - | - | - | - | - | - |
| 3a.4.3 | Health physics supplies | - | 538 | - | - | - | - | - | 135 | 673 | 673 | - | - | - | - | - | - | - | - | - | - |
| 3a.4.4 | Heavy equipment rental | - | 753 | - | - | - | - | - | 113 | 866 | 866 | - | - | - | - | - | - | - | - | - | - |
| 3a.4.5 | Disposal of DAW generated | - | - | 10 | 5 | - | 42 | - | 12 | 70 | 70 | - | - | - | 516 | - | - | - | - | 10,311 | 17 |
| 3a.4.6 | Plant energy budget | - | - | - | - | - | - | 1,817 | 272 | 2,089 | 2,089 | - | - | - | - | - | - | - | - | - | - |
| 3a.4.7 | NRC Fees | - | - | - | - | - | - | 335 | 33 | 368 | 368 | - | - | - | - | - | - | - | - | - | - |
| 3a.4.8 | Emergency Planning Fees | - | - | - | - | - | - | 148 | 15 | 163 | - | 163 | - | - | - | - | - | - | - | - | - |
| 3a.4.9 | Fixed Overhead | - | - | - | - | - | - | 2,616 | 392 | 3,009 | 3,009 | - | - | - | - | - | - | - | - | - | - |
| 3a.4.10 | ISFSI Operating Costs | - | - | - | - | - | - | 112 | 17 | 129 | - | 129 | - | - | - | - | - | - | - | - | - |
| 3a.4.11 | Railroad Track Maintenance | - | - | - | - | - | - | 125 | 19 | 144 | 144 | - | - | - | - | - | - | - | - | - | - |
| 3a.4.12 | Security Staff Cost | - | - | - | - | - | - | 4,690 | 703 | 5,393 | 5,107 | 286 | - | - | - | - | - | - | - | - | 69,160 |
| 3a.4.13 | Utility Staff Cost | - | - | - | - | - | - | 16,817 | 2,523 | 19,339 | 18,160 | 1,180 | - | - | - | - | - | - | - | - | 260,000 |
| 3a.4 | Subtotal Period 3a Period-Dependent Costs | - | 1,291 | 10 | 5 | - | 42 | 30,842 | 4,653 | 36,844 | 34,169 | 2,675 | - | - | 516 | - | - | - | - | 10,311 | 17 |
| 3a.0 | TOTAL PERIOD 3a COST | - | 1,291 | 38 | 34 | 14 | 42 | 55,010 | 9,177 | 65,607 | 60,271 | 4,751 | 586 | 43 | 516 | - | - | - | - | 15,565 | 30,678 |
| PERIOD 3b - Decommissioning Preparations | | | | | | | | | | | | | | | | | | | | | |
| Period 3b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| Detailed Work Procedures | | | | | | | | | | | | | | | | | | | | | |
| 3b.1.1.1 | Plant systems | - | - | - | - | - | - | 608 | 91 | 700 | 630 | - | 70 | - | - | - | - | - | - | - | 4,733 |
| 3b.1.1.2 | Reactor internals | - | - | - | - | - | - | 514 | 77 | 591 | 591 | - | - | - | - | - | - | - | - | - | 4,000 |
| 3b.1.1.3 | Remaining buildings | - | - | - | - | - | - | 174 | 26 | 200 | 50 | - | 150 | - | - | - | - | - | - | - | 1,350 |
| 3b.1.1.4 | CRD housings & NIs | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| 3b.1.1.5 | Incore instrumentation | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| 3b.1.1.6 | Removal primary containment | - | - | - | - | - | - | 257 | 39 | 296 | 296 | - | - | - | - | - | - | - | - | - | 2,000 |
| 3b.1.1.7 | Reactor vessel | - | - | - | - | - | - | 467 | 70 | 537 | 537 | - | - | - | - | - | - | - | - | - | 3,630 |
| 3b.1.1.8 | Facility closeout | - | - | - | - | - | - | 154 | 23 | 177 | 89 | - | 89 | - | - | - | - | - | - | - | 1,200 |
| 3b.1.1.9 | Sacrificial shield | - | - | - | - | - | - | 154 | 23 | 177 | 177 | - | - | - | - | - | - | - | - | - | 1,200 |
| 3b.1.1.10 | Reinforced concrete | - | - | - | - | - | - | 129 | 19 | 148 | 74 | - | 74 | - | - | - | - | - | - | - | 1,000 |
| 3b.1.1.11 | Main Turbine | - | - | - | - | - | - | 267 | 40 | 307 | 307 | - | - | - | - | - | - | - | - | - | 2,080 |
| 3b.1.1.12 | Main Condensers | - | - | - | - | - | - | 268 | 40 | 309 | 309 | - | - | - | - | - | - | - | - | - | 2,088 |
| 3b.1.1.13 | Moisture separators & reheaters | - | - | - | - | - | - | 257 | 39 | 296 | 296 | - | - | - | - | - | - | - | - | - | 2,000 |
| 3b.1.1.14 | Radwaste building | - | - | - | - | - | - | 351 | 53 | 403 | 363 | - | 40 | - | - | - | - | - | - | - | 2,730 |
| 3b.1.1.15 | Reactor building | - | - | - | - | - | - | 351 | 53 | 403 | 363 | - | 40 | - | - | - | - | - | - | - | 2,730 |
| 3b.1.1 | Total | - | - | - | - | - | - | 4,208 | 631 | 4,839 | 4,376 | - | 463 | - | - | - | - | - | - | - | 32,741 |
| 3b.1 | Subtotal Period 3b Activity Costs | - | - | - | - | - | - | 4,208 | 631 | 4,839 | 4,376 | - | 463 | - | - | - | - | - | - | - | 32,741 |
| Period 3b Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 3b.3.1 | Decon equipment | 1,055 | - | - | - | - | - | - | 158 | 1,213 | 1,213 | - | - | - | - | - | - | - | - | - | - |
| 3b.3.2 | DOC staff relocation expenses | - | - | - | - | - | - | 1,264 | 190 | 1,454 | 1,454 | - | - | - | - | - | - | - | - | - | - |
| 3b.3.3 | Pipe cutting equipment | - | 1,200 | - | - | - | - | - | 180 | 1,380 | 1,380 | - | - | - | - | - | - | - | - | - | - |
| 3b.3.4 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 900 | 135 | 1,035 | - | 1,035 | - | - | - | - | - | - | - | - | - |
| 3b.3 | Subtotal Period 3b Collateral Costs | 1,055 | 1,200 | - | - | - | - | 2,164 | 663 | 5,082 | 4,047 | 1,035 | - | - | - | - | - | - | - | - | - |
| Period 3b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 3b.4.1 | Decon supplies | 39 | - | - | - | - | - | - | 10 | 48 | 48 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.2 | Insurance | - | - | - | - | - | - | 351 | 35 | 386 | 386 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.3 | Property taxes | - | - | - | - | - | - | 1,614 | 161 | 1,776 | 1,483 | 293 | - | - | - | - | - | - | - | - | - |
| 3b.4.4 | Health physics supplies | - | 295 | - | - | - | - | - | 74 | 369 | 369 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.5 | Heavy equipment rental | - | 375 | - | - | - | - | - | 56 | 432 | 432 | - | - | - | - | - | - | - | - | - | - |

**Monticello Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table H
Monticello Nuclear Generating Plant
SAFSTOR Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|--|---|--------------|--------------|-----------------|-----------------|---------------------------|---------------------|---------------|-------------------|---------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|----------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| Period 3b Period-Dependent Costs (continued) | | | | | | | | | | | | | | | | | | | | | | |
| 3b.4.6 | Disposal of DAW generated | - | - | 6 | 3 | - | 24 | - | 7 | 40 | 40 | - | - | - | 291 | - | - | - | - | 5,814 | 9 | - |
| 3b.4.7 | Plant energy budget | - | - | - | - | - | - | 906 | 136 | 1,042 | 1,042 | - | - | - | - | - | - | - | - | - | - | - |
| 3b.4.8 | NRC Fees | - | - | - | - | - | - | 167 | 17 | 183 | 183 | - | - | - | - | - | - | - | - | - | - | - |
| 3b.4.9 | Emergency Planning Fees | - | - | - | - | - | - | 74 | 7 | 81 | - | 81 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.10 | Fixed Overhead | - | - | - | - | - | - | 1,305 | 196 | 1,500 | 1,500 | - | - | - | - | - | - | - | - | - | - | - |
| 3b.4.11 | ISFSI Operating Costs | - | - | - | - | - | - | 56 | 8 | 64 | - | 64 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.12 | Railroad Track Maintenance | - | - | - | - | - | - | 62 | 9 | 72 | - | - | - | - | - | - | - | - | - | - | - | - |
| 3b.4.13 | Security Staff Cost | - | - | - | - | - | - | 2,338 | 351 | 2,689 | 2,547 | 143 | - | - | - | - | - | - | - | - | - | 34,485 |
| 3b.4.14 | DOC Staff Cost | - | - | - | - | - | - | 5,344 | 802 | 6,146 | 6,146 | - | - | - | - | - | - | - | - | - | - | 58,080 |
| 3b.4.15 | Utility Staff Cost | - | - | - | - | - | - | 8,385 | 1,258 | 9,643 | 9,055 | 588 | - | - | - | - | - | - | - | - | - | 129,644 |
| 3b.4 | Subtotal Period 3b Period-Dependent Costs | 39 | 671 | 6 | 3 | - | 24 | 20,602 | 3,127 | 24,471 | 23,302 | 1,169 | - | - | 291 | - | - | - | - | 5,814 | 9 | 222,210 |
| 3b.0 | TOTAL PERIOD 3b COST | 1,093 | 1,871 | 6 | 3 | - | 24 | 26,974 | 4,421 | 34,392 | 31,725 | 2,204 | 463 | - | 291 | - | - | - | - | 5,814 | 9 | 254,951 |
| PERIOD 3 TOTALS | | 1,093 | 3,162 | 44 | 37 | 14 | 66 | 81,984 | 13,598 | 99,999 | 91,995 | 6,955 | 1,049 | 43 | 806 | - | - | - | - | 21,379 | 30,688 | 676,925 |
| PERIOD 4a - Large Component Removal | | | | | | | | | | | | | | | | | | | | | | |
| Period 4a Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Nuclear Steam Supply System Removal | | | | | | | | | | | | | | | | | | | | | | |
| 4a.1.1.1 | Recirculation System Piping & Valves | 23 | 85 | 27 | 32 | 185 | 264 | - | 134 | 750 | 750 | - | - | 676 | 715 | - | - | - | - | 94,867 | 1,594 | - |
| 4a.1.1.2 | Recirculation Pumps & Motors | 8 | 56 | 16 | 37 | 252 | 270 | - | 131 | 771 | 771 | - | - | 568 | 473 | - | - | - | - | 112,200 | 1,049 | - |
| 4a.1.1.3 | CRDMs & NIs Removal | 41 | 801 | 415 | 98 | - | 1,130 | - | 560 | 3,045 | 3,045 | - | - | - | 3,741 | - | - | - | - | 213,700 | 12,506 | - |
| 4a.1.1.4 | Reactor Vessel Internals | 139 | 6,098 | 8,236 | 1,029 | - | 25,657 | 278 | 19,830 | 61,268 | 61,268 | - | - | - | 2,943 | 1,628 | 600 | - | - | 337,343 | 22,415 | 1,055 |
| 4a.1.1.5 | Vessel & Internals GTCC Disposal | - | - | - | - | - | 4,313 | - | 647 | 4,960 | 4,960 | - | - | - | - | - | - | 1,160 | - | 225,765 | - | - |
| 4a.1.1.6 | Reactor Vessel | - | 8,498 | 1,818 | 837 | - | 6,301 | 278 | 10,229 | 27,961 | 27,961 | - | - | - | 17,823 | - | - | - | - | 1,110,260 | 22,415 | 1,055 |
| 4a.1.1 | Totals | 211 | 15,538 | 10,512 | 2,034 | 438 | 37,935 | 557 | 31,530 | 98,755 | 98,755 | - | - | 1,244 | 25,695 | 1,628 | 600 | 1,160 | - | 2,094,136 | 59,979 | 2,110 |
| Removal of Major Equipment | | | | | | | | | | | | | | | | | | | | | | |
| 4a.1.2 | Main Turbine/Generator | - | 340 | 1,356 | 521 | 6,139 | 439 | - | 1,330 | 10,126 | 10,126 | - | - | 24,835 | 1,383 | - | - | - | - | 1,577,959 | 4,796 | - |
| 4a.1.3 | Main Condensers | - | 1,207 | 360 | 194 | 3,225 | 244 | - | 912 | 6,142 | 6,142 | - | - | 17,396 | 727 | - | - | - | - | 828,955 | 16,823 | - |
| Cascading Costs from Clean Building Demolition | | | | | | | | | | | | | | | | | | | | | | |
| 4a.1.4.1 | Reactor Building | - | 332 | - | - | - | - | - | 50 | 381 | 381 | - | - | - | - | - | - | - | - | - | 2,217 | - |
| 4a.1.4.2 | Radwaste | - | 25 | - | - | - | - | - | 4 | 28 | 28 | - | - | - | - | - | - | - | - | - | 127 | - |
| 4a.1.4.3 | Turbine | - | 127 | - | - | - | - | - | 19 | 146 | 146 | - | - | - | - | - | - | - | - | - | 1,254 | - |
| 4a.1.4 | Totals | - | 483 | - | - | - | - | - | 72 | 556 | 556 | - | - | - | - | - | - | - | - | - | 3,598 | - |
| Disposal of Plant Systems | | | | | | | | | | | | | | | | | | | | | | |
| 4a.1.5.1 | Automatic Press Relief | - | 106 | 2 | 10 | 182 | - | - | 56 | 356 | 356 | - | - | 1,088 | - | - | - | - | - | 44,184 | 1,468 | - |
| 4a.1.5.2 | Chemistry Sampling | - | 24 | 0 | 2 | 35 | - | - | 12 | 73 | 73 | - | - | 207 | - | - | - | - | - | 8,422 | 356 | - |
| 4a.1.5.3 | Chemistry Sampling - Insulated | - | 2 | 0 | 0 | 0 | - | - | 0 | 2 | 2 | - | - | 1 | - | - | - | - | - | 61 | 25 | - |
| 4a.1.5.4 | Circulating Water - RCA | - | 207 | 14 | 62 | 1,114 | - | - | 230 | 1,626 | 1,626 | - | - | 6,656 | - | - | - | - | - | 270,307 | 2,860 | - |
| 4a.1.5.5 | Combustible Gas Control - Insul - RCA | - | 29 | 0 | 2 | 36 | - | - | 13 | 80 | 80 | - | - | 212 | - | - | - | - | - | 8,617 | 378 | - |
| 4a.1.5.6 | Combustible Gas Control - RCA | - | 18 | 1 | 3 | 48 | - | - | 12 | 81 | 81 | - | - | 285 | - | - | - | - | - | 11,577 | 245 | - |
| 4a.1.5.7 | Condensate & Feedwater | - | 888 | 60 | 281 | 5,046 | - | - | 1,027 | 7,303 | 7,303 | - | - | 30,157 | - | - | - | - | - | 1,224,704 | 12,501 | - |
| 4a.1.5.8 | Condensate & Feedwater - Insulated | - | 444 | 12 | 55 | 980 | - | - | 267 | 1,757 | 1,757 | - | - | 5,855 | - | - | - | - | - | 237,764 | 6,185 | - |
| 4a.1.5.9 | Condensate Demin | - | 494 | 9 | 44 | 792 | - | - | 250 | 1,590 | 1,590 | - | - | 4,735 | - | - | - | - | - | 192,293 | 6,784 | - |
| 4a.1.5.10 | Condensate Storage | - | 657 | 16 | 77 | 1,378 | - | - | 384 | 2,512 | 2,512 | - | - | 8,237 | - | - | - | - | - | 334,489 | 9,265 | - |
| 4a.1.5.11 | Control Rod Drive | - | 3 | 0 | 0 | 4 | - | - | 1 | 8 | 8 | - | - | 24 | - | - | - | - | - | 976 | 36 | - |
| 4a.1.5.12 | Control Rod Drive Hydraulic | - | 374 | 5 | 23 | 408 | - | - | 159 | 968 | 968 | - | - | 2,440 | - | - | - | - | - | 99,094 | 5,255 | - |
| 4a.1.5.13 | Core Spray | - | 71 | 10 | 48 | 855 | - | - | 154 | 1,138 | 1,138 | - | - | 5,109 | - | - | - | - | - | 207,487 | 1,026 | - |
| 4a.1.5.14 | Core Spray - Insulated | - | 131 | 2 | 11 | 198 | - | - | 64 | 407 | 407 | - | - | 1,184 | - | - | - | - | - | 48,081 | 1,806 | - |
| 4a.1.5.15 | Demin Water - Insulated - RCA | - | 15 | 0 | 1 | 14 | - | - | 6 | 36 | 36 | - | - | 85 | - | - | - | - | - | 3,445 | 181 | - |
| 4a.1.5.16 | Demin Water - RCA | - | 41 | 1 | 2 | 42 | - | - | 17 | 104 | 104 | - | - | 253 | - | - | - | - | - | 10,278 | 508 | - |
| 4a.1.5.17 | Diesel Oil - RCA | - | 2 | 0 | 0 | 4 | - | - | 1 | 7 | 7 | - | - | 23 | - | - | - | - | - | 931 | 25 | - |
| 4a.1.5.18 | Drywell Atmosphere Cooling - RCA | - | 38 | 1 | 5 | 92 | - | - | 24 | 159 | 159 | - | - | 548 | - | - | - | - | - | 22,244 | 550 | - |
| 4a.1.5.19 | EDG Emerg Service Water - Insul - RCA | - | 0 | 0 | 0 | 0 | - | - | 0 | 1 | 1 | - | - | 2 | - | - | - | - | - | 84 | 4 | - |
| 4a.1.5.20 | Electrical - Clean | - | 13 | - | - | - | - | - | 2 | 15 | - | - | - | - | - | - | - | - | - | - | 182 | - |
| 4a.1.5.21 | Emergency Service Water - Insul - RCA | - | 21 | 0 | 1 | 23 | - | - | 9 | 55 | 55 | - | - | 137 | - | - | - | - | - | 5,544 | 281 | - |
| 4a.1.5.22 | Emergency Service Water - RCA | - | 2 | 0 | 0 | 2 | - | - | 1 | 5 | 5 | - | - | 13 | - | - | - | - | - | 512 | 22 | - |
| 4a.1.5.23 | GEZIP - RCA | - | 3 | 0 | 1 | 17 | - | - | 4 | 25 | 25 | - | - | 103 | - | - | - | - | - | 4,184 | 48 | - |
| 4a.1.5.24 | Generator Physical Design - RCA | - | 5 | 0 | 0 | 5 | - | - | 2 | 12 | 12 | - | - | 31 | - | - | - | - | - | 1,250 | 67 | - |
| 4a.1.5.25 | H2-O2 Control Analyzing | - | 6 | 0 | 0 | 4 | - | - | 2 | 12 | 12 | - | - | 23 | - | - | - | - | - | 948 | 72 | - |
| 4a.1.5.26 | H2-O2 Control Analyzing - Insulated | - | 6 | 0 | 0 | 4 | - | - | 2 | 12 | 12 | - | - | 23 | - | - | - | - | - | 948 | 72 | - |
| 4a.1.5.27 | High Pressure Coolant Injection | - | 60 | 3 | 12 | 211 | - | - | 49 | 334 | 334 | - | - | 1,262 | - | - | - | - | - | 51,257 | 850 | - |

**Monticello Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table H
Monticello Nuclear Generating Plant
SAFSTOR Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| Disposal of Plant Systems (continued) | | | | | | | | | | | | | | | | | | | | | |
| 4a.1.5.28 | High Pressure Coolant Injection - Insula | - | 198 | 4 | 21 | 379 | - | - | 110 | 713 | 713 | - | - | 2,266 | - | - | - | - | 92,018 | 2,734 | - |
| 4a.1.5.29 | Hydrogen Cooling | - | 8 | - | - | - | - | - | 1 | 10 | - | - | 10 | - | - | - | - | - | - | 118 | - |
| 4a.1.5.30 | Hydrogen Cooling - RCA | - | 7 | 0 | 0 | 7 | - | - | 3 | 17 | 17 | - | - | 39 | - | - | - | - | 1,600 | 79 | - |
| 4a.1.5.31 | Hydrogen Seal Oil - RCA | - | 17 | 0 | 2 | 32 | - | - | 9 | 60 | 60 | - | - | 189 | - | - | - | - | 7,669 | 212 | - |
| 4a.1.5.32 | Hydrogen Water Chemistry - RCA | - | 24 | 0 | 1 | 23 | - | - | 10 | 59 | 59 | - | - | 140 | - | - | - | - | 5,672 | 304 | - |
| 4a.1.5.33 | Instrument & Service Air - RCA | - | 225 | 4 | 17 | 296 | - | - | 103 | 644 | 644 | - | - | 1,768 | - | - | - | - | 71,810 | 2,733 | - |
| 4a.1.5.34 | Main Condenser | - | 177 | 4 | 18 | 318 | - | - | 95 | 613 | 613 | - | - | 1,903 | - | - | - | - | 77,301 | 2,443 | - |
| 4a.1.5.35 | Main Steam | - | 225 | 6 | 28 | 498 | - | - | 136 | 892 | 892 | - | - | 2,975 | - | - | - | - | 120,806 | 3,122 | - |
| 4a.1.5.36 | Main Turbine | - | 909 | 63 | 298 | 5,335 | - | - | 1,079 | 7,684 | 7,684 | - | - | 31,885 | - | - | - | - | 1,294,866 | 12,952 | - |
| 4a.1.5.37 | Main Turbine - Insulated | - | 193 | 7 | 32 | 579 | - | - | 141 | 952 | 952 | - | - | 3,460 | - | - | - | - | 140,506 | 2,725 | - |
| 4a.1.5.38 | Miscellaneous | - | 38 | 1 | 3 | 51 | - | - | 18 | 110 | 110 | - | - | 302 | - | - | - | - | 12,283 | 556 | - |
| 4a.1.5.39 | Off Gas Recombiner | - | 169 | 6 | 27 | 479 | - | - | 119 | 799 | 799 | - | - | 2,861 | - | - | - | - | 116,194 | 2,387 | - |
| 4a.1.5.40 | Off Gas Recombiner - Insulated | - | 351 | 5 | 22 | 393 | - | - | 150 | 921 | 921 | - | - | 2,350 | - | - | - | - | 95,441 | 4,785 | - |
| 4a.1.5.41 | Post Accident Sampling | - | 23 | 0 | 1 | 16 | - | - | 8 | 48 | 48 | - | - | 99 | - | - | - | - | 4,004 | 306 | - |
| 4a.1.5.42 | Post Accident Sampling - Insulated | - | 15 | 0 | 1 | 11 | - | - | 6 | 33 | 33 | - | - | 67 | - | - | - | - | 2,737 | 190 | - |
| 4a.1.5.43 | RHR Service Water - Insulated - RCA | - | 83 | 3 | 14 | 248 | - | - | 60 | 409 | 409 | - | - | 1,485 | - | - | - | - | 60,293 | 1,125 | - |
| 4a.1.5.44 | RHR Service Water - RCA | - | 4 | 0 | 0 | 6 | - | - | 2 | 12 | 12 | - | - | 35 | - | - | - | - | 1,410 | 57 | - |
| 4a.1.5.45 | Reactor Feedwater Pump Seal | - | 50 | 1 | 3 | 55 | - | - | 21 | 130 | 130 | - | - | 327 | - | - | - | - | 13,295 | 687 | - |
| 4a.1.5.46 | Residual Heat Removal | - | 226 | 58 | 147 | 2,110 | 514 | - | 529 | 3,584 | 3,584 | - | - | 12,609 | 1,519 | - | - | - | 609,174 | 3,282 | - |
| 4a.1.5.47 | Residual Heat Removal - Insulated | - | 500 | 39 | 74 | 851 | 464 | - | 384 | 2,312 | 2,312 | - | - | 5,084 | 1,374 | - | - | - | 294,206 | 7,027 | - |
| 4a.1.5.48 | Rx Core Isolation Cooling | - | 43 | 1 | 3 | 61 | - | - | 21 | 129 | 129 | - | - | 364 | - | - | - | - | 14,781 | 609 | - |
| 4a.1.5.49 | Rx Core Isolation Cooling - Insulated | - | 97 | 1 | 5 | 94 | - | - | 39 | 237 | 237 | - | - | 563 | - | - | - | - | 22,843 | 1,315 | - |
| 4a.1.5.50 | Rx Recirculation | - | 53 | 5 | 4 | 16 | 52 | - | 30 | 161 | 161 | - | - | 96 | 152 | - | - | - | 13,794 | 691 | - |
| 4a.1.5.51 | Snubbers | - | 151 | 1 | 5 | 84 | - | - | 51 | 292 | 292 | - | - | 502 | - | - | - | - | 20,395 | 2,272 | - |
| 4a.1.5.52 | Standby Liquid Control - Insul - RCA | - | 4 | 0 | 0 | 4 | - | - | 2 | 9 | 9 | - | - | 22 | - | - | - | - | 904 | 48 | - |
| 4a.1.5.53 | Standby Liquid Control - RCA | - | 26 | 1 | 2 | 41 | - | - | 13 | 83 | 83 | - | - | 245 | - | - | - | - | 9,969 | 341 | - |
| 4a.1.5.54 | Stator Cooling - RCA | - | 7 | 0 | 1 | 21 | - | - | 5 | 35 | 35 | - | - | 126 | - | - | - | - | 5,135 | 98 | - |
| 4a.1.5.55 | Traversing Incore Probe | - | 3 | 0 | 0 | 0 | 2 | - | 1 | 7 | 7 | - | - | 2 | 5 | - | - | - | 379 | 46 | - |
| 4a.1.5 | Totals | - | 7,490 | 347 | 1,370 | 23,501 | 1,032 | - | 5,894 | 39,634 | 39,610 | - | 24 | 140,459 | 3,050 | - | - | - | 5,899,167 | 104,297 | - |
| 4a.1.6 | Scaffolding in support of decommissioning | - | 2,106 | 22 | 12 | 191 | 31 | - | 567 | 2,929 | 2,929 | - | - | 1,030 | 91 | - | - | - | 52,111 | 19,968 | - |
| 4a.1 | Subtotal Period 4a Activity Costs | 211 | 27,165 | 12,598 | 4,132 | 33,494 | 39,680 | 557 | 40,305 | 158,142 | 158,117 | - | 24 | 184,963 | 30,945 | 1,628 | 600 | 1,160 | 10,452,330 | 209,462 | 2,110 |
| Period 4a Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 4a.3.1 | Process decommissioning water waste | 4 | - | 7 | 12 | - | 28 | - | 12 | 63 | 63 | - | - | - | 64 | - | - | - | 3,856 | 13 | - |
| 4a.3.3 | Small tool allowance | - | 267 | - | - | - | - | - | 40 | 307 | 276 | - | 31 | - | - | - | - | - | - | - | - |
| 4a.3.4 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 2,351 | 353 | 2,704 | - | 2,704 | - | - | - | - | - | - | - | - | - |
| 4a.3 | Subtotal Period 4a Collateral Costs | 4 | 267 | 7 | 12 | - | 28 | 2,351 | 404 | 3,073 | 339 | 2,704 | 31 | - | 64 | - | - | - | 3,856 | 13 | - |
| Period 4a Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 4a.4.1 | Decon supplies | 87 | - | - | - | - | - | - | 22 | 109 | 109 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.2 | Insurance | - | - | - | - | - | - | 790 | 79 | 869 | 869 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.3 | Property taxes | - | - | - | - | - | - | 3,594 | 359 | 3,953 | 3,293 | 660 | - | - | - | - | - | - | - | - | - |
| 4a.4.4 | Health physics supplies | - | 1,872 | - | - | - | - | - | 468 | 2,340 | 2,340 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.5 | Heavy equipment rental | - | 2,811 | - | - | - | - | - | 422 | 3,232 | 3,232 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.6 | Disposal of DAW generated | - | - | 89 | 46 | - | 370 | - | 108 | 612 | 612 | - | - | - | 4,485 | - | - | - | 89,703 | 146 | - |
| 4a.4.7 | Plant energy budget | - | - | - | - | - | - | 1,938 | 291 | 2,229 | 2,229 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.8 | NRC Fees | - | - | - | - | - | - | 544 | 54 | 598 | 598 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.9 | Emergency Planning Fees | - | - | - | - | - | - | 167 | 17 | 183 | - | 183 | - | - | - | - | - | - | - | - | - |
| 4a.4.10 | Fixed Overhead | - | - | - | - | - | - | 2,380 | 357 | 2,737 | 2,737 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.11 | Liquid Radwaste Processing Equipment/Services | - | - | - | - | - | - | 477 | 72 | 549 | 549 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.12 | ISFSI Operating Costs | - | - | - | - | - | - | 126 | 19 | 145 | - | 145 | - | - | - | - | - | - | - | - | - |
| 4a.4.13 | Railroad Track Maintenance | - | - | - | - | - | - | 140 | 21 | 162 | 162 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.14 | Remedial Actions Surveys | - | - | - | - | - | - | 1,258 | 189 | 1,447 | 1,447 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.15 | Security Staff Cost | - | - | - | - | - | - | 6,666 | 1,000 | 7,666 | 5,734 | 1,932 | - | - | - | - | - | - | - | - | 101,051 |
| 4a.4.16 | DOC Staff Cost | - | - | - | - | - | - | 14,604 | 2,191 | 16,795 | 16,795 | - | - | - | - | - | - | - | - | - | 161,214 |
| 4a.4.17 | Utility Staff Cost | - | - | - | - | - | - | 19,141 | 2,871 | 22,012 | 20,691 | 1,321 | - | - | - | - | - | - | - | - | 294,391 |
| 4a.4 | Subtotal Period 4a Period-Dependent Costs | 87 | 4,683 | 89 | 46 | - | 370 | 51,826 | 8,539 | 65,639 | 61,399 | 4,241 | - | - | 4,485 | - | - | - | 89,703 | 146 | 556,657 |
| 4a.0 | TOTAL PERIOD 4a COST | 302 | 32,114 | 12,694 | 4,190 | 33,494 | 40,078 | 54,734 | 49,247 | 226,854 | 219,855 | 6,944 | 55 | 184,963 | 35,494 | 1,628 | 600 | 1,160 | 10,545,890 | 209,621 | 558,767 |
| PERIOD 4b - Site Decontamination | | | | | | | | | | | | | | | | | | | | | |
| Period 4b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| 4b.1.1 | Remove spent fuel racks | 591 | 58 | 103 | 149 | - | 2,572 | - | 986 | 4,459 | 4,459 | - | - | - | 7,653 | - | - | - | 486,170 | 906 | - |

**Monticello Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table H
Monticello Nuclear Generating Plant
SAFSTOR Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|-----------------------------------|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|--------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| Disposal of Plant Systems | | | | | | | | | | | | | | | | | | | | | | |
| 4b.1.2.1 | ALARA/Radiological | - | 16 | 0 | 0 | 8 | - | - | 5 | 30 | 30 | - | - | 49 | - | - | - | - | - | 1,987 | 247 | - |
| 4b.1.2.2 | Alternate N2 - RCA | - | 16 | 0 | 1 | 16 | - | - | 7 | 40 | 40 | - | - | 93 | - | - | - | - | - | 3,765 | 185 | - |
| 4b.1.2.3 | Cranes/Heavy Loads/Rigging - RCA | - | 3 | 0 | 1 | 17 | - | - | 4 | 25 | 25 | - | - | 103 | - | - | - | - | - | 4,184 | 48 | - |
| 4b.1.2.4 | Decontamination Projects | - | 1 | 0 | 0 | 1 | - | - | 0 | 2 | 2 | - | - | 3 | - | - | - | - | - | 125 | 15 | - |
| 4b.1.2.5 | Electrical - Contaminated | - | 400 | 5 | 23 | 421 | - | - | 167 | 1,016 | 1,016 | - | - | 2,514 | - | - | - | - | - | 102,112 | 5,633 | - |
| 4b.1.2.6 | Electrical - Contaminated Fuel Pool | - | 42 | 1 | 2 | 42 | - | - | 17 | 105 | 105 | - | - | 253 | - | - | - | - | - | 10,272 | 592 | - |
| 4b.1.2.7 | Electrical - Decontam. Fuel Pool Area | - | 297 | 5 | 23 | 411 | - | - | 140 | 876 | 876 | - | - | 2,457 | - | - | - | - | - | 99,783 | 4,090 | - |
| 4b.1.2.8 | Electrical - Decontaminated | - | 2,698 | 48 | 218 | 3,906 | - | - | 1,298 | 8,167 | 8,167 | - | - | 23,344 | - | - | - | - | - | 948,013 | 37,107 | - |
| 4b.1.2.9 | Fire - RCA | - | 101 | 1 | 6 | 103 | - | - | 42 | 253 | 253 | - | - | 614 | - | - | - | - | - | 24,917 | 1,324 | - |
| 4b.1.2.10 | Fire - RCA - Fuel Pool Area | - | 11 | 0 | 1 | 10 | - | - | 4 | 26 | 26 | - | - | 62 | - | - | - | - | - | 2,499 | 143 | - |
| 4b.1.2.11 | Fuel Pool Cooling & Cleanup | - | 387 | 20 | 33 | 343 | 241 | - | 216 | 1,241 | 1,241 | - | - | 2,051 | 712 | - | - | - | - | 128,918 | 5,363 | - |
| 4b.1.2.12 | Fuel Pool Cooling & Cleanup - Insulated | - | 37 | 2 | 3 | 22 | 24 | - | 19 | 107 | 107 | - | - | 130 | 71 | - | - | - | - | 9,830 | 514 | - |
| 4b.1.2.13 | HVAC Ductwork | - | 276 | 6 | 26 | 469 | - | - | 144 | 921 | 921 | - | - | 2,805 | 921 | - | - | - | - | 113,913 | 3,539 | - |
| 4b.1.2.14 | HVAC Ductwork - Fuel Pool Area | - | 31 | 1 | 3 | 52 | - | - | 16 | 102 | 102 | - | - | 312 | - | - | - | - | - | 12,657 | 393 | - |
| 4b.1.2.15 | HVAC/Chilled Water - RCA | - | 324 | 6 | 26 | 461 | - | - | 155 | 971 | 971 | - | - | 2,752 | - | - | - | - | - | 111,779 | 3,985 | - |
| 4b.1.2.16 | HVAC/Chilled Water - RCA Fuel Pool Area | - | 33 | 0 | 2 | 37 | - | - | 14 | 87 | 87 | - | - | 223 | - | - | - | - | - | 9,072 | 397 | - |
| 4b.1.2.17 | Heating & Ventilation | - | 433 | 13 | 59 | 1,060 | - | - | 277 | 1,842 | 1,842 | - | - | 6,334 | - | - | - | - | - | 257,243 | 6,340 | - |
| 4b.1.2.18 | Heating Boiler - Insulated - RCA | - | 3 | 0 | 0 | 4 | - | - | 1 | 9 | 9 | - | - | 26 | - | - | - | - | - | 1,058 | 35 | - |
| 4b.1.2.19 | Instrument & Service Air-RCA-Fuel Pool | - | 29 | 1 | 2 | 45 | - | - | 14 | 91 | 91 | - | - | 267 | - | - | - | - | - | 10,841 | 357 | - |
| 4b.1.2.20 | Liquid Radwaste | - | 621 | 31 | 57 | 703 | 311 | - | 350 | 2,072 | 2,072 | - | - | 4,203 | 915 | - | - | - | - | 229,422 | 8,550 | - |
| 4b.1.2.21 | Makeup Demin - RCA | - | 103 | 3 | 14 | 246 | - | - | 65 | 431 | 431 | - | - | 1,471 | - | - | - | - | - | 59,747 | 1,412 | - |
| 4b.1.2.22 | Non-Essential Diesel Generator - RCA | - | 27 | 3 | 13 | 238 | - | - | 45 | 327 | 327 | - | - | 1,424 | - | - | - | - | - | 57,832 | 395 | - |
| 4b.1.2.23 | Off Gas Holdup | - | 310 | 7 | 34 | 607 | - | - | 174 | 1,133 | 1,133 | - | - | 3,629 | - | - | - | - | - | 147,355 | 4,256 | - |
| 4b.1.2.24 | Primary Containment | - | 411 | 16 | 77 | 1,389 | - | - | 324 | 2,218 | 2,218 | - | - | 8,302 | - | - | - | - | - | 337,148 | 5,729 | - |
| 4b.1.2.25 | Process Radiation Monitors | - | 41 | 0 | 2 | 36 | - | - | 16 | 95 | 95 | - | - | 213 | - | - | - | - | - | 8,667 | 577 | - |
| 4b.1.2.26 | Rx Bldg Closed Cng Water - Insul - RCA | - | 114 | 2 | 9 | 163 | - | - | 54 | 343 | 343 | - | - | 977 | - | - | - | - | - | 39,675 | 1,484 | - |
| 4b.1.2.27 | Rx Bldg Closed Cng Water - RCA | - | 184 | 15 | 66 | 1,187 | - | - | 235 | 1,687 | 1,687 | - | - | 7,093 | - | - | - | - | - | 288,031 | 2,489 | - |
| 4b.1.2.28 | Rx Component Handling Equip | - | 127 | 11 | 24 | 291 | 139 | - | 115 | 708 | 708 | - | - | 1,737 | 415 | - | - | - | - | 96,901 | 1,839 | - |
| 4b.1.2.29 | Rx Pressure Vessel | - | 43 | 5 | 5 | 27 | 57 | - | 30 | 167 | 167 | - | - | 161 | 169 | - | - | - | - | 17,375 | 578 | - |
| 4b.1.2.30 | Rx Water Cleanup | - | 239 | 16 | 15 | 47 | 214 | - | 124 | 655 | 655 | - | - | 278 | 630 | - | - | - | - | 51,819 | 3,264 | - |
| 4b.1.2.31 | Secondary Containment | - | 112 | 3 | 13 | 229 | - | - | 65 | 421 | 421 | - | - | 1,372 | - | - | - | - | - | 55,702 | 1,569 | - |
| 4b.1.2.32 | Service & Seal Water - Insulated - RCA | - | 120 | 2 | 11 | 197 | - | - | 62 | 392 | 392 | - | - | 1,180 | - | - | - | - | - | 47,917 | 1,565 | - |
| 4b.1.2.33 | Service & Seal Water - RCA | - | 159 | 4 | 17 | 303 | - | - | 88 | 570 | 570 | - | - | 1,809 | - | - | - | - | - | 73,453 | 2,016 | - |
| 4b.1.2.34 | Service Air Blower - RCA | - | 15 | 0 | 2 | 34 | - | - | 9 | 62 | 62 | - | - | 206 | - | - | - | - | - | 8,364 | 206 | - |
| 4b.1.2.35 | Solid Radwaste | - | 446 | 21 | 45 | 567 | 223 | - | 261 | 1,563 | 1,563 | - | - | 3,390 | 659 | - | - | - | - | 179,772 | 6,270 | - |
| 4b.1.2.36 | Structures & Buildings | - | 70 | 1 | 4 | 80 | - | - | 30 | 185 | 185 | - | - | 477 | - | - | - | - | - | 19,351 | 1,005 | - |
| 4b.1.2.37 | Wells & Domestic Water | - | 10 | - | - | - | - | - | 1 | 11 | - | - | 11 | - | - | - | - | - | - | - | 144 | - |
| 4b.1.2.38 | Wells & Domestic Water - RCA | - | 52 | 1 | 3 | 57 | - | - | 22 | 136 | 136 | - | - | 342 | - | - | - | - | - | 13,874 | 633 | - |
| 4b.1.2 | Totals | - | 8,342 | 249 | 841 | 13,829 | 1,210 | - | 4,613 | 29,085 | 29,073 | - | 11 | 82,654 | 3,571 | - | - | - | - | 3,585,374 | 114,290 | - |
| 4b.1.3 | Scaffolding in support of decommissioning | - | 3,159 | 33 | 19 | 286 | 46 | - | 850 | 4,394 | 4,394 | - | - | 1,545 | 136 | - | - | - | - | 78,166 | 29,953 | - |
| Decontamination of Site Buildings | | | | | | | | | | | | | | | | | | | | | | |
| 4b.1.4.1 | Reactor Building | 4,668 | 2,596 | 178 | 516 | 8,044 | 1,181 | - | 4,580 | 21,764 | 21,764 | - | - | 48,077 | 7,014 | - | - | - | - | 2,317,670 | 100,718 | - |
| 4b.1.4.2 | Admin | 96 | 5 | 0 | 3 | - | 15 | - | 53 | 172 | 172 | - | - | - | 145 | - | - | - | - | 6,840 | 1,421 | - |
| 4b.1.4.3 | HP/PCI Room | 26 | 25 | 1 | 3 | 20 | 14 | - | 26 | 115 | 115 | - | - | 118 | 125 | - | - | - | - | 10,759 | 703 | - |
| 4b.1.4.4 | Hot Shop | 15 | 4 | 0 | 2 | - | 11 | - | 11 | 43 | 43 | - | - | - | 103 | - | - | - | - | 4,860 | 254 | - |
| 4b.1.4.5 | LLRW Storage & Shipping | 52 | 22 | 2 | 8 | 5 | 45 | - | 45 | 179 | 179 | - | - | 31 | 433 | - | - | - | - | 21,708 | 1,003 | - |
| 4b.1.4.6 | Offgas Stack | 336 | 241 | 7 | 23 | 225 | 82 | - | 286 | 1,199 | 1,199 | - | - | 1,343 | 669 | - | - | - | - | 87,045 | 7,924 | - |
| 4b.1.4.7 | Offgas Storage & Compressor | 36 | 15 | 1 | 6 | 4 | 33 | - | 32 | 128 | 128 | - | - | 25 | 316 | - | - | - | - | 15,948 | 696 | - |
| 4b.1.4.8 | Radwaste | 109 | 54 | 3 | 17 | 29 | 96 | - | 100 | 410 | 410 | - | - | 172 | 910 | - | - | - | - | 49,943 | 2,229 | - |
| 4b.1.4.9 | Radwaste Material Storage Warehouse | 57 | 21 | 2 | 9 | - | 52 | - | 48 | 189 | 189 | - | - | - | 495 | - | - | - | - | 23,400 | 1,062 | - |
| 4b.1.4.10 | Recombiner | 24 | 22 | 1 | 5 | 33 | 24 | - | 30 | 140 | 140 | - | - | 199 | 216 | - | - | - | - | 18,405 | 616 | - |
| 4b.1.4.11 | Turbine | 638 | 314 | 21 | 104 | 215 | 564 | - | 588 | 2,444 | 2,444 | - | - | 1,283 | 5,299 | - | - | - | - | 303,150 | 12,856 | - |
| 4b.1.4.12 | Turbine Building Addition | 53 | 19 | 1 | 8 | - | 45 | - | 44 | 169 | 169 | - | - | - | 434 | - | - | - | - | 20,478 | 968 | - |
| 4b.1.4.13 | Reactor (Post Fuel) | 849 | 2,325 | 172 | 913 | 329 | 5,301 | - | 2,535 | 12,425 | 12,425 | - | - | 1,969 | 50,605 | - | - | - | - | 2,471,778 | 40,860 | - |
| 4b.1.4 | Totals | 6,960 | 5,663 | 390 | 1,617 | 8,904 | 7,465 | - | 8,379 | 39,378 | 39,378 | - | - | 53,216 | 66,764 | - | - | - | - | 5,351,984 | 171,309 | - |
| 4b.1.5 | Prepare/submit License Termination Plan | - | - | - | - | - | - | 526 | 79 | 605 | 605 | - | - | - | - | - | - | - | - | - | - | 4,096 |
| 4b.1.6 | Receive NRC approval of termination plan | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - | - |
| 4b.1 | Subtotal Period 4b Activity Costs | 7,551 | 17,223 | 776 | 2,626 | 23,019 | 11,293 | 526 | 14,907 | 77,921 | 77,910 | - | 11 | 137,414 | 78,124 | - | - | - | - | 9,501,694 | 316,457 | 4,096 |
| Period 4b Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 4b.2.1 | License Termination Survey Planning | - | - | - | - | - | - | 1,458 | 437 | 1,896 | 1,896 | - | - | - | - | - | - | - | - | - | - | 12,480 |
| 4b.2.2 | Excavation of Underground Services | - | 1,972 | - | - | - | - | 376 | 550 | 2,898 | 2,898 | - | - | - | - | - | - | - | - | - | 12,493 | - |
| 4b.2.3 | Operational Equipment | - | - | 23 | 92 | 1,211 | - | - | 198 | 1,524 | 1,524 | - | - | 11,760 | - | - | - | - | - | | | |

**Monticello Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table H
Monticello Nuclear Generating Plant
SAFSTOR Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|---|--------------|---------------|-----------------|-----------------|---------------------------|---------------------|----------------|-------------------|----------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| 4b.2 | Subtotal Period 4b Additional Costs | - | 1,972 | 23 | 92 | 1,211 | - | 1,835 | 1,185 | 6,317 | 6,317 | - | - | 11,760 | - | - | - | - | 294,000 | 12,525 | 12,480 |
| Period 4b Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 4b.3.1 | Process decommissioning water waste | 12 | - | 22 | 39 | - | 88 | - | 36 | 196 | 196 | - | - | - | 202 | - | - | - | 12,097 | 39 | - |
| 4b.3.3 | Small tool allowance | - | 397 | - | - | - | - | - | 60 | 456 | 456 | - | - | - | - | - | - | - | - | - | - |
| 4b.3.4 | Decommissioning Equipment Disposition | - | - | 130 | 82 | 1,112 | 178 | - | 237 | 1,739 | 1,739 | - | - | 6,000 | 529 | - | - | - | 303,608 | 147 | - |
| 4b.3.5 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 6,214 | 932 | 7,147 | - | 7,147 | - | - | - | - | - | - | - | - | - |
| 4b.3 | Subtotal Period 4b Collateral Costs | 12 | 397 | 152 | 121 | 1,112 | 266 | 6,214 | 1,264 | 9,538 | 2,392 | 7,147 | - | 6,000 | 731 | - | - | - | 315,705 | 186 | - |
| Period 4b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 4b.4.1 | Decon supplies | 1,701 | - | - | - | - | - | - | 425 | 2,126 | 2,126 | - | - | - | - | - | - | - | - | - | - |
| 4b.4.2 | Insurance | - | - | - | - | - | - | 1,434 | 143 | 1,577 | 1,577 | - | - | - | - | - | - | - | - | - | - |
| 4b.4.3 | Property taxes | - | - | - | - | - | - | 6,289 | 629 | 6,917 | 5,721 | 1,197 | - | - | - | - | - | - | - | - | - |
| 4b.4.4 | Health physics supplies | - | 3,050 | - | - | - | - | - | 763 | 3,813 | 3,813 | - | - | - | - | - | - | - | - | - | - |
| 4b.4.5 | Heavy equipment rental | - | 5,239 | - | - | - | - | - | 786 | 6,024 | 6,024 | - | - | - | - | - | - | - | - | - | - |
| 4b.4.6 | Disposal of DAW generated | - | - | 117 | 60 | - | 486 | - | 142 | 805 | 805 | - | - | 5,895 | - | - | - | - | 117,897 | 192 | - |
| 4b.4.7 | Plant energy budget | - | - | - | - | - | - | 2,777 | 417 | 3,194 | 3,194 | - | - | - | - | - | - | - | - | - | - |
| 4b.4.8 | NRC Fees | - | - | - | - | - | - | 986 | 99 | 1,085 | 1,085 | - | - | - | - | - | - | - | - | - | - |
| 4b.4.9 | Emergency Planning Fees | - | - | - | - | - | - | 302 | 30 | 332 | - | 332 | - | - | - | - | - | - | - | - | - |
| 4b.4.10 | Fixed Overhead | - | - | - | - | - | - | 4,319 | 648 | 4,967 | 4,967 | - | - | - | - | - | - | - | - | - | - |
| 4b.4.11 | Liquid Radwaste Processing Equipment/Services | - | - | - | - | - | - | 866 | 130 | 996 | 996 | - | - | - | - | - | - | - | - | - | - |
| 4b.4.12 | ISFSI Operating Costs | - | - | - | - | - | - | 228 | 34 | 262 | - | 262 | - | - | - | - | - | - | - | - | - |
| 4b.4.13 | Railroad Track Maintenance | - | - | - | - | - | - | 255 | 38 | 293 | 293 | - | - | - | - | - | - | - | - | - | - |
| 4b.4.14 | Remedial Actions Surveys | - | - | - | - | - | - | 2,283 | 343 | 2,626 | 2,626 | - | - | - | - | - | - | - | - | - | - |
| 4b.4.15 | Security Staff Cost | - | - | - | - | - | - | 12,097 | 1,815 | 13,912 | 10,406 | 3,506 | - | - | - | - | - | - | - | - | 183,371 |
| 4b.4.16 | DOC Staff Cost | - | - | - | - | - | - | 25,916 | 3,887 | 29,803 | 29,803 | - | - | - | - | - | - | - | - | - | 284,065 |
| 4b.4.17 | Utility Staff Cost | - | - | - | - | - | - | 32,869 | 4,930 | 37,799 | 35,380 | 2,419 | - | - | - | - | - | - | - | - | 504,534 |
| 4b.4 | Subtotal Period 4b Period-Dependent Costs | 1,701 | 8,289 | 117 | 60 | - | 486 | 90,622 | 15,259 | 116,533 | 108,817 | 7,716 | - | - | 5,895 | - | - | - | 117,897 | 192 | 971,970 |
| 4b.0 | TOTAL PERIOD 4b COST | 9,264 | 27,881 | 1,067 | 2,898 | 25,343 | 12,044 | 99,197 | 32,614 | 210,310 | 195,435 | 14,863 | 11 | 155,174 | 84,750 | - | - | - | 10,229,300 | 329,361 | 988,546 |
| PERIOD 4f - License Termination | | | | | | | | | | | | | | | | | | | | | |
| Period 4f Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| 4f.1.1 | ORISE confirmatory survey | - | - | - | - | - | - | 166 | 50 | 216 | 216 | - | - | - | - | - | - | - | - | - | - |
| 4f.1.2 | Terminate license | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 4f.1 | Subtotal Period 4f Activity Costs | - | - | - | - | - | - | 166 | 50 | 216 | 216 | - | - | - | - | - | - | - | - | - | - |
| Period 4f Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 4f.2.1 | License Termination Survey | - | - | - | - | - | - | 6,920 | 2,076 | 8,995 | 8,995 | - | - | - | - | - | - | - | - | 95,048 | 6,240 |
| 4f.2.2 | License Termination ISFSI | - | 57 | 188 | 987 | - | 5,925 | 3,118 | 2,569 | 12,844 | 12,844 | - | - | 21,949 | - | - | - | - | 2,633,402 | 10,339 | 14,785 |
| 4f.2 | Subtotal Period 4f Additional Costs | - | 57 | 188 | 987 | - | 5,925 | 10,037 | 4,645 | 21,839 | 21,839 | - | - | 21,949 | - | - | - | - | 2,633,402 | 105,387 | 21,025 |
| Period 4f Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 4f.3.1 | DOC staff relocation expenses | - | - | - | - | - | - | 1,264 | 190 | 1,454 | 1,454 | - | - | - | - | - | - | - | - | - | - |
| 4f.3.2 | Small tool allowance | - | 0 | - | - | - | - | - | 0 | 1 | 1 | - | - | - | - | - | - | - | - | - | - |
| 4f.3.3 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 846 | 127 | 972 | - | 972 | - | - | - | - | - | - | - | - | - |
| 4f.3 | Subtotal Period 4f Collateral Costs | - | 0 | - | - | - | - | 2,110 | 317 | 2,427 | 1,454 | 972 | - | - | - | - | - | - | - | - | - |
| Period 4f Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 4f.4.1 | Insurance | - | - | - | - | - | - | 530 | 53 | 583 | - | 583 | - | - | - | - | - | - | - | - | - |
| 4f.4.2 | Property taxes | - | - | - | - | - | - | 2,198 | 220 | 2,417 | 1,975 | 442 | - | - | - | - | - | - | - | - | - |
| 4f.4.3 | Health physics supplies | - | 766 | - | - | - | - | - | 192 | 958 | 958 | - | - | - | - | - | - | - | - | - | - |
| 4f.4.4 | Disposal of DAW generated | - | - | 7 | 4 | - | 29 | - | 9 | 48 | 48 | - | - | 355 | - | - | - | - | 7,097 | 12 | - |
| 4f.4.5 | Plant energy budget | - | - | - | - | - | - | 274 | 41 | 315 | 315 | - | - | - | - | - | - | - | - | - | - |
| 4f.4.6 | NRC Fees | - | - | - | - | - | - | 426 | 43 | 468 | 468 | - | - | - | - | - | - | - | - | - | - |
| 4f.4.7 | Emergency Planning Fees | - | - | - | - | - | - | 112 | 11 | 123 | - | 123 | - | - | - | - | - | - | - | - | - |
| 4f.4.8 | Fixed Overhead | - | - | - | - | - | - | 1,597 | 239 | 1,836 | 1,836 | - | - | - | - | - | - | - | - | - | - |
| 4f.4.9 | ISFSI Operating Costs | - | - | - | - | - | - | 84 | 13 | 97 | - | 97 | - | - | - | - | - | - | - | - | - |
| 4f.4.10 | Railroad Track Maintenance | - | - | - | - | - | - | 94 | 14 | 108 | 108 | - | - | - | - | - | - | - | - | - | - |
| 4f.4.11 | Security Staff Cost | - | - | - | - | - | - | 3,463 | 519 | 3,982 | 1,565 | 2,417 | - | - | - | - | - | - | - | - | 50,932 |
| 4f.4.12 | DOC Staff Cost | - | - | - | - | - | - | 5,393 | 809 | 6,201 | 6,201 | - | - | - | - | - | - | - | - | - | 57,200 |
| 4f.4.13 | Utility Staff Cost | - | - | - | - | - | - | 5,762 | 864 | 6,626 | 5,738 | 888 | - | - | - | - | - | - | - | - | 80,707 |
| 4f.4 | Subtotal Period 4f Period-Dependent Costs | - | 766 | 7 | 4 | - | 29 | 19,931 | 3,027 | 23,764 | 19,213 | 4,550 | - | 355 | - | - | - | - | 7,097 | 12 | 188,838 |
| 4f.0 | TOTAL PERIOD 4f COST | - | 824 | 195 | 991 | - | 5,954 | 32,244 | 8,037 | 48,245 | 42,722 | 5,523 | - | - | 22,304 | - | - | - | 2,640,499 | 105,398 | 209,863 |
| PERIOD 4 TOTALS | | 9,566 | 60,820 | 13,956 | 8,079 | 58,837 | 58,077 | 186,175 | 89,899 | 485,409 | 458,013 | 27,330 | 66 | 340,138 | 142,548 | 1,628 | 600 | 1,160 | 23,415,680 | 644,380 | 1,757,176 |

**Monticello Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table H
Monticello Nuclear Generating Plant
SAFSTOR Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|---------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| PERIOD 5b - Site Restoration | | | | | | | | | | | | | | | | | | | | | | |
| Period 5b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Demolition of Remaining Site Buildings | | | | | | | | | | | | | | | | | | | | | | |
| 5b.1.1.1 | Reactor Building | - | 1,971 | - | - | - | - | - | 296 | 2,267 | - | - | 2,267 | - | - | - | - | - | - | - | 13,911 | - |
| 5b.1.1.2 | Condensate Tanks Foundation | - | 10 | - | - | - | - | - | 1 | 11 | - | - | 11 | - | - | - | - | - | - | - | 50 | - |
| 5b.1.1.3 | Discharge Retention Basin | - | 4 | - | - | - | - | - | 1 | 5 | - | - | 5 | - | - | - | - | - | - | - | 25 | - |
| 5b.1.1.4 | HPCI Room | - | 19 | - | - | - | - | - | 3 | 22 | - | - | 22 | - | - | - | - | - | - | - | 97 | - |
| 5b.1.1.5 | Hot Shop | - | 16 | - | - | - | - | - | 2 | 19 | - | - | 19 | - | - | - | - | - | - | - | 177 | - |
| 5b.1.1.6 | Hydrogen & Oxygen Storage | - | 2 | - | - | - | - | - | 0 | 2 | - | - | 2 | - | - | - | - | - | - | - | 19 | - |
| 5b.1.1.7 | LLRW Storage & Shipping | - | 83 | - | - | - | - | - | 12 | 95 | - | - | 95 | - | - | - | - | - | - | - | 662 | - |
| 5b.1.1.8 | MSIV | - | 4 | - | - | - | - | - | 1 | 4 | - | - | 4 | - | - | - | - | - | - | - | 42 | - |
| 5b.1.1.9 | Misc Structures 2017 | - | 1,410 | - | - | - | - | - | 212 | 1,622 | - | - | 1,622 | - | - | - | - | - | - | - | 13,042 | - |
| 5b.1.1.10 | Offgas Stack | - | 108 | - | - | - | - | - | 16 | 124 | - | - | 124 | - | - | - | - | - | - | - | 544 | - |
| 5b.1.1.11 | Offgas Storage & Compressor | - | 39 | - | - | - | - | - | 6 | 45 | - | - | 45 | - | - | - | - | - | - | - | 199 | - |
| 5b.1.1.12 | Radwaste | - | 228 | - | - | - | - | - | 34 | 262 | - | - | 262 | - | - | - | - | - | - | - | 1,220 | - |
| 5b.1.1.13 | Recombiner | - | 128 | - | - | - | - | - | 19 | 147 | - | - | 147 | - | - | - | - | - | - | - | 713 | - |
| 5b.1.1.14 | Security Barrier | - | 186 | - | - | - | - | - | 28 | 214 | - | - | 214 | - | - | - | - | - | - | - | 933 | - |
| 5b.1.1.15 | Structures Greater than 3' Below Grade | - | 2,461 | - | - | - | - | - | 369 | 2,830 | - | - | 2,830 | - | - | - | - | - | - | - | 12,649 | - |
| 5b.1.1.16 | Tank Farm | - | 4 | - | - | - | - | - | 1 | 5 | - | - | 5 | - | - | - | - | - | - | - | 21 | - |
| 5b.1.1.17 | Turbine | - | 1,259 | - | - | - | - | - | 189 | 1,448 | - | - | 1,448 | - | - | - | - | - | - | - | 13,036 | - |
| 5b.1.1.18 | Turbine Building Addition | - | 55 | - | - | - | - | - | 8 | 63 | - | - | 63 | - | - | - | - | - | - | - | 618 | - |
| 5b.1.1.19 | Turbine Pedestal | - | 182 | - | - | - | - | - | 27 | 209 | - | - | 209 | - | - | - | - | - | - | - | 926 | - |
| 5b.1.1 | Totals | - | 8,169 | - | - | - | - | - | 1,225 | 9,394 | - | - | 9,394 | - | - | - | - | - | - | - | 58,885 | - |
| Site Closeout Activities | | | | | | | | | | | | | | | | | | | | | | |
| 5b.1.2 | Grade & landscape site | - | 896 | - | - | - | - | - | 134 | 1,031 | - | - | 1,031 | - | - | - | - | - | - | - | 1,841 | - |
| 5b.1.3 | Final report to NRC | - | - | - | - | - | - | 200 | 30 | 231 | 231 | - | - | - | - | - | - | - | - | - | - | 1,560 |
| 5b.1 | Subtotal Period 5b Activity Costs | - | 9,065 | - | - | - | - | 200 | 1,390 | 10,655 | 231 | - | 10,425 | - | - | - | - | - | - | - | 60,726 | 1,560 |
| Period 5b Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 5b.2.1 | Clean Concrete Disposal | - | 3,322 | - | - | - | - | 13 | 500 | 3,835 | - | - | 3,835 | - | - | - | - | - | - | - | 12 | - |
| 5b.2.2 | Intake Structure Cofferdam | - | 335 | - | - | - | - | - | 50 | 385 | - | - | 385 | - | - | - | - | - | - | - | 2,584 | - |
| 5b.2.3 | Construction Debris | - | - | - | - | - | - | 1,170 | 176 | 1,346 | - | - | 1,346 | - | - | - | - | - | - | - | - | - |
| 5b.2.4 | Backfill | - | 5,583 | - | - | - | - | - | 837 | 6,421 | - | - | 6,421 | - | - | - | - | - | - | - | 5,422 | - |
| 5b.2.5 | Discharge Structure Cofferdam | - | 442 | - | - | - | - | - | 66 | 508 | - | - | 508 | - | - | - | - | - | - | - | 3,552 | - |
| 5b.2.6 | Demolition and Site Restoration of ISFSI | - | 1,486 | - | - | - | - | 233 | 258 | 1,977 | - | - | 1,977 | - | - | - | - | - | - | - | 6,957 | 160 |
| 5b.2 | Subtotal Period 5b Additional Costs | - | 11,168 | - | - | - | - | 1,416 | 1,888 | 14,472 | - | - | 14,472 | - | - | - | - | - | - | - | 18,527 | 160 |
| Period 5b Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 5b.3.1 | Small tool allowance | - | 121 | - | - | - | - | - | 18 | 139 | - | - | 139 | - | - | - | - | - | - | - | - | - |
| 5b.3 | Subtotal Period 5b Collateral Costs | - | 121 | - | - | - | - | - | 18 | 139 | - | - | 139 | - | - | - | - | - | - | - | - | - |
| Period 5b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 5b.4.1 | Insurance | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 5b.4.2 | Property taxes | - | - | - | - | - | - | 4,770 | 477 | 5,247 | - | - | 5,247 | - | - | - | - | - | - | - | - | - |
| 5b.4.3 | Heavy equipment rental | - | 5,842 | - | - | - | - | - | 876 | 6,719 | - | - | 6,719 | - | - | - | - | - | - | - | - | - |
| 5b.4.4 | Plant energy budget | - | - | - | - | - | - | 315 | 47 | 362 | - | - | 362 | - | - | - | - | - | - | - | - | - |
| 5b.4.5 | Emergency Planning Fees | - | - | - | - | - | - | 47 | 5 | 51 | - | 51 | - | - | - | - | - | - | - | - | - | - |
| 5b.4.6 | Fixed Overhead | - | - | - | - | - | - | 1,122 | 168 | 1,290 | - | - | 1,290 | - | - | - | - | - | - | - | - | - |
| 5b.4.7 | Railroad Track Maintenance | - | - | - | - | - | - | 217 | 33 | 249 | - | - | 249 | - | - | - | - | - | - | - | - | - |
| 5b.4.8 | Security Staff Cost | - | - | - | - | - | - | 3,131 | 470 | 3,601 | - | - | 3,601 | - | - | - | - | - | - | - | - | 43,287 |
| 5b.4.9 | DOC Staff Cost | - | - | - | - | - | - | 11,729 | 1,759 | 13,489 | - | - | 13,489 | - | - | - | - | - | - | - | - | 122,646 |
| 5b.4.10 | Utility Staff Cost | - | - | - | - | - | - | 4,931 | 740 | 5,671 | - | - | 5,671 | - | - | - | - | - | - | - | - | 70,341 |
| 5b.4 | Subtotal Period 5b Period-Dependent Costs | - | 5,842 | - | - | - | - | 26,262 | 4,575 | 36,679 | - | 51 | 36,628 | - | - | - | - | - | - | - | - | 236,274 |
| 5b.0 | TOTAL PERIOD 5b COST | - | 26,196 | - | - | - | - | 27,879 | 7,870 | 61,945 | 231 | 51 | 61,663 | - | - | - | - | - | - | - | 79,253 | 237,994 |
| PERIOD 5 TOTALS | | | | | | | | | | | | | | | | | | | | | | |
| TOTAL COST TO DECOMMISSION | | | | | | | | | | | | | | | | | | | | | | |
| | | 21,259 | 100,298 | 14,401 | 8,642 | 58,852 | 59,785 | 1,405,928 | 272,752 | 1,941,915 | 1,250,098 | 629,040 | 62,778 | 340,180 | 153,222 | 1,628 | 600 | 1,160 | 23,728,260 | 876,203 | 9,952,997 | |

**Monticello Nuclear Generating Plant
 Decommissioning Cost Analysis**

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**Table H
 Monticello Nuclear Generating Plant
 SAFSTOR Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
 (Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|--|----------------------|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| TOTAL COST TO DECOMMISSION WITH 16.34% CONTINGENCY: | | | | | \$1,941,915 | thousands of 2020 dollars | | | | | | | | | | | | | | | |
| TOTAL NRC LICENSE TERMINATION COST IS 64.37% OR: | | | | | \$1,250,098 | thousands of 2020 dollars | | | | | | | | | | | | | | | |
| SPENT FUEL MANAGEMENT COST IS 32.39% OR: | | | | | \$629,040 | thousands of 2020 dollars | | | | | | | | | | | | | | | |
| NON-NUCLEAR DEMOLITION COST IS 3.23% OR: | | | | | \$62,778 | thousands of 2020 dollars | | | | | | | | | | | | | | | |
| TOTAL LOW-LEVEL RADIOACTIVE WASTE VOLUME BURIED (EXCLUDING GTCC): | | | | | 155,449 | Cubic Feet | | | | | | | | | | | | | | | |
| TOTAL GREATER THAN CLASS C RADWASTE VOLUME GENERATED: | | | | | 1,160 | Cubic Feet | | | | | | | | | | | | | | | |
| TOTAL SCRAP METAL REMOVED: | | | | | 23,123 | Tons | | | | | | | | | | | | | | | |
| TOTAL CRAFT LABOR REQUIREMENTS: | | | | | 876,203 | Man-hours | | | | | | | | | | | | | | | |

End Notes:
 n/a - indicates that this activity not charged as decommissioning expense
 a - indicates that this activity performed by decommissioning staff
 0 - indicates that this value is less than 0.5 but is non-zero
 A cell containing " - " indicates a zero value

***Monticello Nuclear Generating Plant
Decommissioning Cost Analysis***

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APPENDIX I

DETAILED COST ANALYSIS

SCENARIO 7: SAFSTOR with 100 Year DFS

**Monticello Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table I
Monticello Nuclear Generating Plant
SAFSTOR Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|--|--|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| PERIOD 1a - Shutdown through Transition | | | | | | | | | | | | | | | | | | | | | |
| Period 1a Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| 1a.1.1 | SAFSTOR site characterization survey | - | - | - | - | - | - | 415 | 124 | 539 | 539 | - | - | - | - | - | - | - | - | - | - |
| 1a.1.2 | Prepare preliminary decommissioning cost | - | - | - | - | - | - | 167 | 25 | 192 | 192 | - | - | - | - | - | - | - | - | - | 1,300 |
| 1a.1.3 | Notification of Cessation of Operations | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.4 | Remove fuel & source material | - | - | - | - | - | - | - | - | n/a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.5 | Notification of Permanent Defueling | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.6 | Deactivate plant systems & process waste | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.7 | Prepare and submit PSDAR | - | - | - | - | - | - | 257 | 39 | 296 | 296 | - | - | - | - | - | - | - | - | - | 2,000 |
| 1a.1.8 | Review plant dwgs & specs. | - | - | - | - | - | - | 167 | 25 | 192 | 192 | - | - | - | - | - | - | - | - | - | 1,300 |
| 1a.1.9 | Perform detailed rad survey | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.10 | Estimate by-product inventory | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| 1a.1.11 | End product description | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| 1a.1.12 | Detailed by-product inventory | - | - | - | - | - | - | 193 | 29 | 222 | 222 | - | - | - | - | - | - | - | - | - | 1,500 |
| 1a.1.13 | Define major work sequence | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| 1a.1.14 | Perform SER and EA | - | - | - | - | - | - | 398 | 60 | 458 | 458 | - | - | - | - | - | - | - | - | - | 3,100 |
| 1a.1.15 | Prepare/submit Defueled Technical Specifications | - | - | - | - | - | - | 964 | 145 | 1,108 | 1,108 | - | - | - | - | - | - | - | - | - | 7,500 |
| 1a.1.16 | Perform Site-Specific Cost Study | - | - | - | - | - | - | 643 | 96 | 739 | 739 | - | - | - | - | - | - | - | - | - | 5,000 |
| 1a.1.17 | Prepare/submit Irradiated Fuel Management Plan | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| Activity Specifications | | | | | | | | | | | | | | | | | | | | | |
| 1a.1.18.1 | Prepare plant and facilities for SAFSTOR | - | - | - | - | - | - | 632 | 95 | 727 | 727 | - | - | - | - | - | - | - | - | - | 4,920 |
| 1a.1.18.2 | Plant systems | - | - | - | - | - | - | 536 | 80 | 616 | 616 | - | - | - | - | - | - | - | - | - | 4,167 |
| 1a.1.18.3 | Plant structures and buildings | - | - | - | - | - | - | 401 | 60 | 461 | 461 | - | - | - | - | - | - | - | - | - | 3,120 |
| 1a.1.18.4 | Waste management | - | - | - | - | - | - | 257 | 39 | 296 | 296 | - | - | - | - | - | - | - | - | - | 2,000 |
| 1a.1.18.5 | Facility and site dormancy | - | - | - | - | - | - | 257 | 39 | 296 | 296 | - | - | - | - | - | - | - | - | - | 2,000 |
| 1a.1.18 | Total | - | - | - | - | - | - | 2,083 | 312 | 2,395 | 2,395 | - | - | - | - | - | - | - | - | - | 16,207 |
| Detailed Work Procedures | | | | | | | | | | | | | | | | | | | | | |
| 1a.1.19.1 | Plant systems | - | - | - | - | - | - | 152 | 23 | 175 | 175 | - | - | - | - | - | - | - | - | - | 1,183 |
| 1a.1.19.2 | Facility closeout & dormancy | - | - | - | - | - | - | 154 | 23 | 177 | 177 | - | - | - | - | - | - | - | - | - | 1,200 |
| 1a.1.19 | Total | - | - | - | - | - | - | 306 | 46 | 352 | 352 | - | - | - | - | - | - | - | - | - | 2,383 |
| 1a.1.20 | Procure vacuum drying system | - | - | - | - | - | - | 13 | 2 | 15 | 15 | - | - | - | - | - | - | - | - | - | 100 |
| 1a.1.21 | Drain/de-energize non-cont. systems | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.22 | Drain & dry NSSS | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.23 | Drain/de-energize contaminated systems | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.24 | Decon/secure contaminated systems | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1 | Subtotal Period 1a Activity Costs | - | - | - | - | - | - | 6,120 | 980 | 7,100 | 7,100 | - | - | - | - | - | - | - | - | - | 44,390 |
| Period 1a Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 1a.3.1 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 1,323 | 198 | 1,522 | - | 1,522 | - | - | - | - | - | - | - | - | - |
| 1a.3.2 | Retention and Severance | - | - | - | - | - | - | 9,892 | 1,484 | 11,376 | 11,376 | - | - | - | - | - | - | - | - | - | - |
| 1a.3 | Subtotal Period 1a Collateral Costs | - | - | - | - | - | - | 11,215 | 1,682 | 12,897 | 11,376 | 1,522 | - | - | - | - | - | - | - | - | - |
| Period 1a Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 1a.4.1 | Insurance | - | - | - | - | - | - | 2,328 | 233 | 2,561 | 2,561 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.2 | Property taxes | - | - | - | - | - | - | 3,570 | 357 | 3,927 | 3,927 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.3 | Health physics supplies | - | 614 | - | - | - | - | - | 153 | 767 | 767 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.4 | Heavy equipment rental | - | 753 | - | - | - | - | - | 113 | 866 | 866 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.5 | Disposal of DAW generated | - | - | 12 | 6 | - | 50 | - | 15 | 83 | 83 | - | - | 610 | - | - | - | - | 12,190 | 20 | - |
| 1a.4.6 | Plant energy budget | - | - | - | - | - | - | 1,817 | 272 | 2,089 | 2,089 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.7 | NRC Fees | - | - | - | - | - | - | 892 | 89 | 981 | 981 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.8 | Emergency Planning Fees | - | - | - | - | - | - | 3,428 | 343 | 3,770 | - | 3,770 | - | - | - | - | - | - | - | - | - |
| 1a.4.9 | Fixed Overhead | - | - | - | - | - | - | 2,616 | 392 | 3,009 | 3,009 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.10 | Spent Fuel Pool O&M | - | - | - | - | - | - | 845 | 127 | 971 | - | 971 | - | - | - | - | - | - | - | - | - |
| 1a.4.11 | ISFSI Operating Costs | - | - | - | - | - | - | 112 | 17 | 129 | - | 129 | - | - | - | - | - | - | - | - | - |
| 1a.4.12 | Railroad Track Maintenance | - | - | - | - | - | - | 125 | 19 | 144 | 144 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.13 | Security Staff Cost | - | - | - | - | - | - | 16,372 | 2,456 | 18,827 | 18,827 | - | - | - | - | - | - | - | - | - | 245,440 |
| 1a.4.14 | Utility Staff Cost | - | - | - | - | - | - | 27,285 | 4,093 | 31,378 | 31,378 | - | - | - | - | - | - | - | - | - | 422,240 |
| 1a.4 | Subtotal Period 1a Period-Dependent Costs | - | 1,367 | 12 | 6 | - | 50 | 59,389 | 8,679 | 69,502 | 64,632 | 4,870 | - | 610 | - | - | - | - | 12,190 | 20 | 667,680 |
| 1a.0 | TOTAL PERIOD 1a COST | - | 1,367 | 12 | 6 | - | 50 | 76,724 | 11,341 | 89,500 | 83,108 | 6,392 | - | 610 | - | - | - | - | 12,190 | 20 | 712,070 |

**Monticello Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table I
Monticello Nuclear Generating Plant
SAFSTOR Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|--|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|---------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| PERIOD 1b - SAFSTOR Limited DECON Activities | | | | | | | | | | | | | | | | | | | | | | |
| Period 1b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Decontamination of Site Buildings | | | | | | | | | | | | | | | | | | | | | | |
| 1b.1.1.1 | Reactor Building | 5,155 | - | - | - | - | - | - | 2,577 | 7,732 | 7,732 | - | - | - | - | - | - | - | - | - | 70,157 | - |
| 1b.1.1.2 | Admin | 95 | - | - | - | - | - | - | 48 | 143 | 143 | - | - | - | - | - | - | - | - | - | 1,357 | - |
| 1b.1.1.3 | HPCI Room | 25 | - | - | - | - | - | - | 13 | 38 | 38 | - | - | - | - | - | - | - | - | - | 350 | - |
| 1b.1.1.4 | Hot Shop | 15 | - | - | - | - | - | - | 7 | 22 | 22 | - | - | - | - | - | - | - | - | - | 208 | - |
| 1b.1.1.5 | LLRW Storage & Shipping | 49 | - | - | - | - | - | - | 25 | 74 | 74 | - | - | - | - | - | - | - | - | - | 705 | - |
| 1b.1.1.6 | Offgas Stack | 326 | - | - | - | - | - | - | 163 | 489 | 489 | - | - | - | - | - | - | - | - | - | 4,575 | - |
| 1b.1.1.7 | Offgas Storage & Compressor | 34 | - | - | - | - | - | - | 17 | 51 | 51 | - | - | - | - | - | - | - | - | - | 488 | - |
| 1b.1.1.8 | Radwaste | 103 | - | - | - | - | - | - | 51 | 154 | 154 | - | - | - | - | - | - | - | - | - | 1,473 | - |
| 1b.1.1.9 | Radwaste Material Storage Warehouse | 54 | - | - | - | - | - | - | 27 | 81 | 81 | - | - | - | - | - | - | - | - | - | 768 | - |
| 1b.1.1.10 | Recombiner | 23 | - | - | - | - | - | - | 11 | 34 | 34 | - | - | - | - | - | - | - | - | - | 323 | - |
| 1b.1.1.11 | Turbine | 600 | - | - | - | - | - | - | 300 | 900 | 900 | - | - | - | - | - | - | - | - | - | 8,583 | - |
| 1b.1.1.12 | Turbine Building Addition | 50 | - | - | - | - | - | - | 25 | 74 | 74 | - | - | - | - | - | - | - | - | - | 709 | - |
| 1b.1.1.13 | Reactor (Post Fuel) | 830 | - | - | - | - | - | - | 415 | 1,245 | 1,245 | - | - | - | - | - | - | - | - | - | 11,337 | - |
| 1b.1.1 | Totals | 7,359 | - | - | - | - | - | - | 3,679 | 11,038 | 11,038 | - | - | - | - | - | - | - | - | - | 101,033 | - |
| 1b.1 | Subtotal Period 1b Activity Costs | 7,359 | - | - | - | - | - | - | 3,679 | 11,038 | 11,038 | - | - | - | - | - | - | - | - | - | 101,033 | - |
| Period 1b Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 1b.2.1 | Spent Fuel Pool Isolation | - | - | - | - | - | - | 12,675 | 1,901 | 14,576 | 14,576 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.2 | Subtotal Period 1b Additional Costs | - | - | - | - | - | - | 12,675 | 1,901 | 14,576 | 14,576 | - | - | - | - | - | - | - | - | - | - | - |
| Period 1b Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 1b.3.1 | Decon equipment | 1,055 | - | - | - | - | - | - | 158 | 1,213 | 1,213 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.3.2 | Process decommissioning water waste | 220 | - | 145 | 258 | - | 588 | - | 310 | 1,522 | 1,522 | - | - | - | 1,351 | - | - | - | - | - | 81,042 | 263 |
| 1b.3.4 | Small tool allowance | - | 126 | - | - | - | - | - | 19 | 145 | 145 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.3.5 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 196 | 29 | 225 | - | 225 | - | - | - | - | - | - | - | - | - | - |
| 1b.3.6 | Retention and Severance | - | - | - | - | - | - | 3,601 | 540 | 4,141 | 4,141 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.3 | Subtotal Period 1b Collateral Costs | 1,274 | 126 | 145 | 258 | - | 588 | 3,796 | 1,057 | 7,246 | 7,021 | 225 | - | - | 1,351 | - | - | - | - | - | 81,042 | 263 |
| Period 1b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 1b.4.1 | Decon supplies | 1,562 | - | - | - | - | - | - | 391 | 1,953 | 1,953 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.2 | Insurance | - | - | - | - | - | - | 580 | 58 | 638 | 638 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.3 | Property taxes | - | - | - | - | - | - | 890 | 89 | 979 | 979 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.4 | Health physics supplies | - | 729 | - | - | - | - | - | 182 | 911 | 911 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.5 | Heavy equipment rental | - | 188 | - | - | - | - | - | 28 | 216 | 216 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.6 | Disposal of DAW generated | - | - | 11 | 6 | - | 46 | - | 13 | 76 | 76 | - | - | - | 555 | - | - | - | - | - | 11,092 | 18 |
| 1b.4.7 | Plant energy budget | - | - | - | - | - | - | 453 | 68 | 521 | 521 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.8 | NRC Fees | - | - | - | - | - | - | 161 | 16 | 177 | 177 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.9 | Emergency Planning Fees | - | - | - | - | - | - | 708 | 71 | 779 | - | 779 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.10 | Fixed Overhead | - | - | - | - | - | - | 652 | 98 | 750 | 750 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.11 | Spent Fuel Pool O&M | - | - | - | - | - | - | 211 | 32 | 242 | - | 242 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.12 | ISFSI Operating Costs | - | - | - | - | - | - | 28 | 4 | 32 | - | 32 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.13 | Railroad Track Maintenance | - | - | - | - | - | - | 31 | 5 | 36 | 36 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.14 | Security Staff Cost | - | - | - | - | - | - | 4,082 | 612 | 4,694 | 4,694 | - | - | - | - | - | - | - | - | - | - | 61,192 |
| 1b.4.15 | Utility Staff Cost | - | - | - | - | - | - | 6,803 | 1,020 | 7,823 | 7,823 | - | - | - | - | - | - | - | - | - | - | 105,271 |
| 1b.4 | Subtotal Period 1b Period-Dependent Costs | 1,562 | 917 | 11 | 6 | - | 46 | 14,599 | 2,687 | 19,828 | 18,775 | 1,053 | - | - | 555 | - | - | - | - | - | 11,092 | 18 |
| 1b.0 | TOTAL PERIOD 1b COST | 10,195 | 1,043 | 156 | 264 | - | 634 | 31,070 | 9,325 | 52,688 | 51,410 | 1,278 | - | - | 1,905 | - | - | - | - | - | 92,135 | 101,314 |
| PERIOD 1c - Preparations for SAFSTOR Dormancy | | | | | | | | | | | | | | | | | | | | | | |
| Period 1c Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| 1c.1.1 | Prepare support equipment for storage | - | 527 | - | - | - | - | - | 79 | 606 | 606 | - | - | - | - | - | - | - | - | - | - | 3,000 |
| 1c.1.2 | Install containment pressure equal. lines | - | 54 | - | - | - | - | - | 8 | 62 | 62 | - | - | - | - | - | - | - | - | - | - | 700 |
| 1c.1.3 | Interim survey prior to dormancy | - | - | - | - | - | - | 733 | 220 | 953 | 953 | - | - | - | - | - | - | - | - | - | - | 12,801 |
| 1c.1.4 | Secure building accesses | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 1c.1.5 | Prepare & submit interim report | - | - | - | - | - | - | 75 | 11 | 86 | 86 | - | - | - | - | - | - | - | - | - | - | 583 |
| 1c.1 | Subtotal Period 1c Activity Costs | - | 581 | - | - | - | - | 808 | 318 | 1,707 | 1,707 | - | - | - | - | - | - | - | - | - | - | 16,501 |
| Period 1c Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 1c.3.1 | Process decommissioning water waste | 161 | - | 107 | 190 | - | 433 | - | 228 | 1,120 | 1,120 | - | - | - | 994 | - | - | - | - | - | 59,653 | 194 |

**Monticello Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table I
Monticello Nuclear Generating Plant
SAFSTOR Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|---|---------------|--------------|-----------------|-----------------|---------------------------|---------------------|----------------|-------------------|----------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| Period 1c Collateral Costs (continued) | | | | | | | | | | | | | | | | | | | | | |
| 1c.3.3 | Small tool allowance | - | 5 | - | - | - | - | - | 1 | 6 | 6 | - | - | - | - | - | - | - | - | - | - |
| 1c.3.4 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 2,539 | 381 | 2,920 | - | 2,920 | - | - | - | - | - | - | - | - | - |
| 1c.3.5 | Retention and Severance | - | - | - | - | - | - | 2,734 | 410 | 3,145 | 3,145 | - | - | - | - | - | - | - | - | - | - |
| 1c.3 | Subtotal Period 1c Collateral Costs | 161 | 5 | 107 | 190 | - | 433 | 5,273 | 1,020 | 7,190 | 4,270 | 2,920 | - | - | 994 | - | - | - | 59,653 | 194 | - |
| Period 1c Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 1c.4.1 | Insurance | - | - | - | - | - | - | 580 | 58 | 638 | 638 | - | - | - | - | - | - | - | - | - | - |
| 1c.4.2 | Property taxes | - | - | - | - | - | - | 888 | 89 | 977 | 977 | - | - | - | - | - | - | - | - | - | - |
| 1c.4.3 | Health physics supplies | - | 248 | - | - | - | - | - | 62 | 310 | 310 | - | - | - | - | - | - | - | - | - | - |
| 1c.4.4 | Heavy equipment rental | - | 188 | - | - | - | - | - | 28 | 216 | 216 | - | - | - | - | - | - | - | - | - | - |
| 1c.4.5 | Disposal of DAW generated | - | - | 3 | 2 | - | 13 | - | 4 | 21 | 21 | - | - | - | 152 | - | - | - | 3,039 | 5 | - |
| 1c.4.6 | Plant energy budget | - | - | - | - | - | - | 453 | 68 | 521 | 521 | - | - | - | - | - | - | - | - | - | - |
| 1c.4.7 | NRC Fees | - | - | - | - | - | - | 161 | 16 | 177 | 177 | - | - | - | - | - | - | - | - | - | - |
| 1c.4.8 | Emergency Planning Fees | - | - | - | - | - | - | 708 | 71 | 779 | - | 779 | - | - | - | - | - | - | - | - | - |
| 1c.4.9 | Fixed Overhead | - | - | - | - | - | - | 652 | 98 | 750 | 750 | - | - | - | - | - | - | - | - | - | - |
| 1c.4.10 | Spent Fuel Pool O&M | - | - | - | - | - | - | 211 | 32 | 242 | - | 242 | - | - | - | - | - | - | - | - | - |
| 1c.4.11 | ISFSI Operating Costs | - | - | - | - | - | - | 28 | 4 | 32 | - | 32 | - | - | - | - | - | - | - | - | - |
| 1c.4.12 | Railroad Track Maintenance | - | - | - | - | - | - | 31 | 5 | 36 | 36 | - | - | - | - | - | - | - | - | - | - |
| 1c.4.13 | Security Staff Cost | - | - | - | - | - | - | 4,082 | 612 | 4,694 | 4,694 | - | - | - | - | - | - | - | - | - | 61,192 |
| 1c.4.14 | Utility Staff Cost | - | - | - | - | - | - | 6,803 | 1,020 | 7,823 | 7,823 | - | - | - | - | - | - | - | - | - | 105,271 |
| 1c.4 | Subtotal Period 1c Period-Dependent Costs | - | 436 | 3 | 2 | - | 13 | 14,597 | 2,166 | 17,216 | 16,163 | 1,053 | - | - | 152 | - | - | - | 3,039 | 5 | 166,463 |
| 1c.0 | TOTAL PERIOD 1c COST | 161 | 1,021 | 110 | 192 | - | 446 | 20,678 | 3,505 | 26,113 | 22,140 | 3,973 | - | - | 1,146 | - | - | - | 62,692 | 16,700 | 167,046 |
| PERIOD 1 TOTALS | | 10,357 | 3,431 | 278 | 462 | - | 1,130 | 128,472 | 24,170 | 168,301 | 156,658 | 11,643 | - | - | 3,661 | - | - | - | 167,017 | 118,034 | 1,045,579 |
| PERIOD 2a - SAFSTOR Dormancy with Wet Spent Fuel Storage | | | | | | | | | | | | | | | | | | | | | |
| Period 2a Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| 2a.1.1 | Quarterly Inspection | - | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - |
| 2a.1.2 | Semi-annual environmental survey | - | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - |
| 2a.1.3 | Prepare reports | - | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - |
| 2a.1.4 | Bituminous roof replacement | - | - | - | - | - | - | 155 | 23 | 178 | 178 | - | - | - | - | - | - | - | - | - | - |
| 2a.1.5 | Maintenance supplies | - | - | - | - | - | - | 349 | 87 | 437 | 437 | - | - | - | - | - | - | - | - | - | - |
| 2a.1 | Subtotal Period 2a Activity Costs | - | - | - | - | - | - | 504 | 111 | 615 | 615 | - | - | - | - | - | - | - | - | - | - |
| Period 2a Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 2a.2.1 | Security Modifications | - | - | - | - | - | - | 8,696 | 1,304 | 10,000 | 10,000 | - | - | - | - | - | - | - | - | - | - |
| 2a.2 | Subtotal Period 2a Additional Costs | - | - | - | - | - | - | 8,696 | 1,304 | 10,000 | 10,000 | - | - | - | - | - | - | - | - | - | - |
| Period 2a Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 2a.3.1 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 141,374 | 21,206 | 162,580 | - | 162,580 | - | - | - | - | - | - | - | - | - |
| 2a.3.2 | Retention and Severance | - | - | - | - | - | - | 19,427 | 2,914 | 22,341 | 22,341 | - | - | - | - | - | - | - | - | - | - |
| 2a.3 | Subtotal Period 2a Collateral Costs | - | - | - | - | - | - | 160,801 | 24,120 | 184,921 | 22,341 | 162,580 | - | - | - | - | - | - | - | - | - |
| Period 2a Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 2a.4.1 | Insurance | - | - | - | - | - | - | 1,761 | 176 | 1,937 | 1,937 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.2 | Property taxes | - | - | - | - | - | - | 8,932 | 893 | 9,825 | 9,825 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.3 | Health physics supplies | - | 617 | - | - | - | - | - | 154 | 771 | 771 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.4 | Disposal of DAW generated | - | - | 11 | 6 | - | 47 | - | 14 | 79 | 79 | - | - | - | 576 | - | - | - | 11,523 | 19 | - |
| 2a.4.5 | Plant energy budget | - | - | - | - | - | - | 910 | 136 | 1,046 | 1,046 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.6 | NRC Fees | - | - | - | - | - | - | 610 | 61 | 671 | 671 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.7 | Emergency Planning Fees | - | - | - | - | - | - | 7,110 | 711 | 7,821 | - | 7,821 | - | - | - | - | - | - | - | - | - |
| 2a.4.8 | Fixed Overhead | - | - | - | - | - | - | 5,306 | 796 | 6,102 | 6,102 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.9 | Spent Fuel Pool O&M | - | - | - | - | - | - | 2,115 | 317 | 2,432 | - | 2,432 | - | - | - | - | - | - | - | - | - |
| 2a.4.10 | ISFSI Operating Costs | - | - | - | - | - | - | 280 | 42 | 322 | - | 322 | - | - | - | - | - | - | - | - | - |
| 2a.4.11 | Railroad Track Maintenance | - | - | - | - | - | - | 639 | 96 | 735 | 735 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.12 | Security Staff Cost | - | - | - | - | - | - | 37,806 | 5,671 | 43,477 | 31,086 | 12,391 | - | - | - | - | - | - | - | - | 562,523 |
| 2a.4.13 | Utility Staff Cost | - | - | - | - | - | - | 13,543 | 2,031 | 15,574 | 12,615 | 2,959 | - | - | - | - | - | - | - | - | 205,738 |
| 2a.4 | Subtotal Period 2a Period-Dependent Costs | - | 617 | 11 | 6 | - | 47 | 79,012 | 11,099 | 90,793 | 64,868 | 25,925 | - | - | 576 | - | - | - | 11,523 | 19 | 768,261 |
| 2a.0 | TOTAL PERIOD 2a COST | - | 617 | 11 | 6 | - | 47 | 249,013 | 36,634 | 286,328 | 97,823 | 188,505 | - | - | 576 | - | - | - | 11,523 | 19 | 768,261 |

**Monticello Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table I
Monticello Nuclear Generating Plant
SAFSTOR Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| PERIOD 2b - SAFSTOR Dormancy with Dry Spent Fuel Storage | | | | | | | | | | | | | | | | | | | | | |
| Period 2b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| 2b.1.1 | Quarterly Inspection | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 2b.1.2 | Semi-annual environmental survey | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 2b.1.3 | Prepare reports | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 2b.1.4 | Bituminous roof replacement | - | - | - | - | - | - | 3,127 | 469 | 3,596 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.1.5 | Maintenance supplies | - | - | - | - | - | - | 7,065 | 1,766 | 8,831 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.1 | Subtotal Period 2b Activity Costs | - | - | - | - | - | - | 10,192 | 2,235 | 12,427 | - | - | - | - | - | - | - | - | - | - | - |
| Period 2b Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 2b.3.1 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 366,775 | 55,016 | 421,791 | - | 421,791 | - | - | - | - | - | - | - | - | - |
| 2b.3 | Subtotal Period 2b Collateral Costs | - | - | - | - | - | - | 366,775 | 55,016 | 421,791 | - | 421,791 | - | - | - | - | - | - | - | - | - |
| Period 2b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 2b.4.1 | Insurance | - | - | - | - | - | - | 35,606 | 3,561 | 39,167 | 39,167 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.2 | Property taxes | - | - | - | - | - | - | 180,613 | 18,061 | 198,674 | 198,674 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.3 | Health physics supplies | - | 6,047 | - | - | - | - | - | 1,512 | 7,559 | 7,559 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.4 | Disposal of DAW generated | - | - | 111 | 57 | - | 461 | - | 135 | 764 | 764 | - | - | 5,595 | - | - | - | - | 111,903 | 182 | - |
| 2b.4.5 | Plant energy budget | - | - | - | - | - | - | 9,196 | 1,379 | 10,576 | 10,576 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.6 | NRC Fees | - | - | - | - | - | - | 11,515 | 1,152 | 12,667 | 12,667 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.7 | Emergency Planning Fees | - | - | - | - | - | - | 7,506 | 751 | 8,256 | - | 8,256 | - | - | - | - | - | - | - | - | - |
| 2b.4.8 | Fixed Overhead | - | - | - | - | - | - | 10,904 | 1,636 | 12,540 | 12,540 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.9 | ISFSI Operating Costs | - | - | - | - | - | - | 5,666 | 850 | 6,516 | - | 6,516 | - | - | - | - | - | - | - | - | - |
| 2b.4.10 | Railroad Track Maintenance | - | - | - | - | - | - | 6,330 | 950 | 7,280 | 7,280 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.11 | Security Staff Cost | - | - | - | - | - | - | 280,802 | 42,120 | 322,922 | 72,658 | 250,265 | - | - | - | - | - | - | - | - | 3,790,775 |
| 2b.4.12 | Utility Staff Cost | - | - | - | - | - | - | 114,547 | 17,182 | 131,729 | 71,924 | 59,805 | - | - | - | - | - | - | - | - | 1,684,789 |
| 2b.4 | Subtotal Period 2b Period-Dependent Costs | - | 6,047 | 111 | 57 | - | 461 | 662,686 | 89,288 | 758,650 | 433,808 | 324,843 | - | - | 5,595 | - | - | - | 111,903 | 182 | 5,475,563 |
| 2b.0 | TOTAL PERIOD 2b COST | - | 6,047 | 111 | 57 | - | 461 | 1,039,652 | 146,539 | 1,192,868 | 446,234 | 746,634 | - | - | 5,595 | - | - | - | 111,903 | 182 | 5,475,563 |
| PERIOD 2 TOTALS | | - | 6,664 | 122 | 63 | - | 509 | 1,288,665 | 183,173 | 1,479,196 | 544,057 | 935,139 | - | - | 6,171 | - | - | - | 123,426 | 201 | 6,243,824 |
| PERIOD 3a - Reactivate Site Following SAFSTOR Dormancy | | | | | | | | | | | | | | | | | | | | | |
| Period 3a Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| 3a.1.1 | Prepare preliminary decommissioning cost | - | - | - | - | - | - | 167 | 25 | 192 | 192 | - | - | - | - | - | - | - | - | - | 1,300 |
| 3a.1.2 | Review plant dwgs & specs. | - | - | - | - | - | - | 591 | 89 | 680 | 680 | - | - | - | - | - | - | - | - | - | 4,600 |
| 3a.1.3 | Perform detailed rad survey | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 3a.1.4 | End product description | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| 3a.1.5 | Detailed by-product inventory | - | - | - | - | - | - | 167 | 25 | 192 | 192 | - | - | - | - | - | - | - | - | - | 1,300 |
| 3a.1.6 | Define major work sequence | - | - | - | - | - | - | 964 | 145 | 1,108 | 1,108 | - | - | - | - | - | - | - | - | - | 7,500 |
| 3a.1.7 | Perform SER and EA | - | - | - | - | - | - | 398 | 60 | 458 | 458 | - | - | - | - | - | - | - | - | - | 3,100 |
| 3a.1.8 | Perform Site-Specific Cost Study | - | - | - | - | - | - | 643 | 96 | 739 | 739 | - | - | - | - | - | - | - | - | - | 5,000 |
| Activity Specifications | | | | | | | | | | | | | | | | | | | | | |
| 3a.1.9.1 | Re-activate plant & temporary facilities | - | - | - | - | - | - | 947 | 142 | 1,089 | 980 | - | 109 | - | - | - | - | - | - | - | 7,370 |
| 3a.1.9.2 | Plant systems | - | - | - | - | - | - | 536 | 80 | 616 | 554 | - | 62 | - | - | - | - | - | - | - | 4,167 |
| 3a.1.9.3 | Reactor internals | - | - | - | - | - | - | 912 | 137 | 1,049 | 1,049 | - | - | - | - | - | - | - | - | - | 7,100 |
| 3a.1.9.4 | Reactor vessel | - | - | - | - | - | - | 835 | 125 | 961 | 961 | - | - | - | - | - | - | - | - | - | 6,500 |
| 3a.1.9.5 | Sacrificial shield | - | - | - | - | - | - | 64 | 10 | 74 | 74 | - | - | - | - | - | - | - | - | - | 500 |
| 3a.1.9.6 | Moisture separators/reheaters | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| 3a.1.9.7 | Reinforced concrete | - | - | - | - | - | - | 206 | 31 | 236 | 118 | - | 118 | - | - | - | - | - | - | - | 1,600 |
| 3a.1.9.8 | Main Turbine | - | - | - | - | - | - | 268 | 40 | 309 | 309 | - | - | - | - | - | - | - | - | - | 2,088 |
| 3a.1.9.9 | Main Condensers | - | - | - | - | - | - | 268 | 40 | 309 | 309 | - | - | - | - | - | - | - | - | - | 2,088 |
| 3a.1.9.10 | Pressure suppression structure | - | - | - | - | - | - | 257 | 39 | 296 | 296 | - | - | - | - | - | - | - | - | - | 2,000 |
| 3a.1.9.11 | Drywell | - | - | - | - | - | - | 206 | 31 | 236 | 236 | - | - | - | - | - | - | - | - | - | 1,600 |
| 3a.1.9.12 | Plant structures & buildings | - | - | - | - | - | - | 401 | 60 | 461 | 231 | - | 231 | - | - | - | - | - | - | - | 3,120 |
| 3a.1.9.13 | Waste management | - | - | - | - | - | - | 591 | 89 | 680 | 680 | - | - | - | - | - | - | - | - | - | 4,600 |
| 3a.1.9.14 | Facility & site closeout | - | - | - | - | - | - | 116 | 17 | 133 | 67 | - | 67 | - | - | - | - | - | - | - | 900 |
| 3a.1.9 | Total | - | - | - | - | - | - | 5,736 | 860 | 6,597 | 6,011 | - | 586 | - | - | - | - | - | - | - | 44,633 |
| Planning & Site Preparations | | | | | | | | | | | | | | | | | | | | | |
| 3a.1.10 | Prepare dismantling sequence | - | - | - | - | - | - | 308 | 46 | 355 | 355 | - | - | - | - | - | - | - | - | - | 2,400 |
| 3a.1.11 | Plant prep. & temp. svces | - | - | - | - | - | - | 3,500 | 525 | 4,025 | 4,025 | - | - | - | - | - | - | - | - | - | - |
| 3a.1.12 | Design water clean-up system | - | - | - | - | - | - | 180 | 27 | 207 | 207 | - | - | - | - | - | - | - | - | - | 1,400 |
| 3a.1.13 | Rigging/Cont. Cntrl Envlps/tooling/etc. | - | - | - | - | - | - | 2,400 | 360 | 2,760 | 2,760 | - | - | - | - | - | - | - | - | - | - |
| 3a.1.14 | Procure casks/liners & containers | - | - | - | - | - | - | 158 | 24 | 182 | 182 | - | - | - | - | - | - | - | - | - | 1,230 |

**Monticello Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table I
Monticello Nuclear Generating Plant
SAFSTOR Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|---------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| 3a.1 | Subtotal Period 3a Activity Costs | - | - | - | - | - | - | 15,341 | 2,301 | 17,643 | 17,057 | - | 586 | - | - | - | - | - | - | - | - | 73,463 |
| Period 3a Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3a.2.1 | Site Characterization | - | - | - | - | - | - | 5,930 | 1,779 | 7,708 | 7,708 | - | - | - | - | - | - | - | - | - | 30,500 | 10,852 |
| 3a.2.2 | Mixed & RCRA Waste | - | - | 28 | 29 | 14 | - | - | 9 | 80 | 80 | - | - | 43 | - | - | - | - | - | - | 5,253 | 161 |
| 3a.2 | Subtotal Period 3a Additional Costs | - | - | 28 | 29 | 14 | - | 5,930 | 1,788 | 7,788 | 7,788 | - | - | 43 | - | - | - | - | - | - | 5,253 | 30,661 |
| Period 3a Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3a.3.1 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 5,693 | 854 | 6,547 | - | 6,547 | - | - | - | - | - | - | - | - | - | - |
| 3a.3 | Subtotal Period 3a Collateral Costs | - | - | - | - | - | - | 5,693 | 854 | 6,547 | - | 6,547 | - | - | - | - | - | - | - | - | - | - |
| Period 3a Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3a.4.1 | Insurance | - | - | - | - | - | - | 703 | 70 | 774 | 442 | 332 | - | - | - | - | - | - | - | - | - | - |
| 3a.4.2 | Property taxes | - | - | - | - | - | - | 3,479 | 348 | 3,827 | 3,241 | 586 | - | - | - | - | - | - | - | - | - | - |
| 3a.4.3 | Health physics supplies | - | 538 | - | - | - | - | - | 135 | 673 | 673 | - | - | - | - | - | - | - | - | - | - | - |
| 3a.4.4 | Heavy equipment rental | - | 753 | - | - | - | - | - | 113 | 866 | 866 | - | - | - | - | - | - | - | - | - | - | - |
| 3a.4.5 | Disposal of DAW generated | - | - | 10 | 5 | - | 42 | - | 12 | 70 | 70 | - | - | - | 516 | - | - | - | - | 10,311 | 17 | - |
| 3a.4.6 | Plant energy budget | - | - | - | - | - | - | 1,817 | 272 | 2,089 | 2,089 | - | - | - | - | - | - | - | - | - | - | - |
| 3a.4.7 | NRC ISFSI Fees | - | - | - | - | - | - | 51 | 5 | 56 | - | 56 | - | - | - | - | - | - | - | - | - | - |
| 3a.4.8 | NRC Fees | - | - | - | - | - | - | 335 | 33 | 368 | 368 | - | - | - | - | - | - | - | - | - | - | - |
| 3a.4.9 | Emergency Planning Fees | - | - | - | - | - | - | 148 | 15 | 163 | - | 163 | - | - | - | - | - | - | - | - | - | - |
| 3a.4.10 | Fixed Overhead | - | - | - | - | - | - | 2,616 | 392 | 3,009 | 3,009 | - | - | - | - | - | - | - | - | - | - | - |
| 3a.4.11 | ISFSI Operating Costs | - | - | - | - | - | - | 112 | 17 | 129 | - | 129 | - | - | - | - | - | - | - | - | - | - |
| 3a.4.12 | Railroad Track Maintenance | - | - | - | - | - | - | 125 | 19 | 144 | 144 | - | - | - | - | - | - | - | - | - | - | - |
| 3a.4.13 | Security Staff Cost | - | - | - | - | - | - | 4,690 | 703 | 5,393 | 5,107 | 286 | - | - | - | - | - | - | - | - | - | 69,160 |
| 3a.4.14 | Utility Staff Cost | - | - | - | - | - | - | 16,817 | 2,523 | 19,339 | 18,160 | 1,180 | - | - | - | - | - | - | - | - | - | 260,000 |
| 3a.4 | Subtotal Period 3a Period-Dependent Costs | - | 1,291 | 10 | 5 | - | 42 | 30,893 | 4,658 | 36,900 | 34,169 | 2,731 | - | - | 516 | - | - | - | - | 10,311 | 17 | 329,160 |
| 3a.0 | TOTAL PERIOD 3a COST | - | 1,291 | 38 | 34 | 14 | 42 | 57,857 | 9,601 | 68,878 | 59,014 | 9,278 | 586 | 43 | 516 | - | - | - | - | 15,565 | 30,678 | 413,475 |
| PERIOD 3b - Decommissioning Preparations | | | | | | | | | | | | | | | | | | | | | | |
| Period 3b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Detailed Work Procedures | | | | | | | | | | | | | | | | | | | | | | |
| 3b.1.1.1 | Plant systems | - | - | - | - | - | - | 608 | 91 | 700 | 630 | - | 70 | - | - | - | - | - | - | - | - | 4,733 |
| 3b.1.1.2 | Reactor internals | - | - | - | - | - | - | 514 | 77 | 591 | 591 | - | - | - | - | - | - | - | - | - | - | 4,000 |
| 3b.1.1.3 | Remaining buildings | - | - | - | - | - | - | 174 | 26 | 200 | 50 | - | 150 | - | - | - | - | - | - | - | - | 1,350 |
| 3b.1.1.4 | CRD housings & NIs | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | - | 1,000 |
| 3b.1.1.5 | Incore instrumentation | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | - | 1,000 |
| 3b.1.1.6 | Removal primary containment | - | - | - | - | - | - | 257 | 39 | 296 | 296 | - | - | - | - | - | - | - | - | - | - | 2,000 |
| 3b.1.1.7 | Reactor vessel | - | - | - | - | - | - | 467 | 70 | 537 | 537 | - | - | - | - | - | - | - | - | - | - | 3,630 |
| 3b.1.1.8 | Facility closeout | - | - | - | - | - | - | 154 | 23 | 177 | 89 | - | 89 | - | - | - | - | - | - | - | - | 1,200 |
| 3b.1.1.9 | Sacrificial shield | - | - | - | - | - | - | 154 | 23 | 177 | 177 | - | - | - | - | - | - | - | - | - | - | 1,200 |
| 3b.1.1.10 | Reinforced concrete | - | - | - | - | - | - | 129 | 19 | 148 | 74 | - | 74 | - | - | - | - | - | - | - | - | 1,000 |
| 3b.1.1.11 | Main Turbine | - | - | - | - | - | - | 267 | 40 | 307 | 307 | - | - | - | - | - | - | - | - | - | - | 2,080 |
| 3b.1.1.12 | Main Condensers | - | - | - | - | - | - | 268 | 40 | 309 | 309 | - | - | - | - | - | - | - | - | - | - | 2,088 |
| 3b.1.1.13 | Moisture separators & reheaters | - | - | - | - | - | - | 257 | 39 | 296 | 296 | - | - | - | - | - | - | - | - | - | - | 2,000 |
| 3b.1.1.14 | Radwaste building | - | - | - | - | - | - | 351 | 53 | 403 | 363 | - | 40 | - | - | - | - | - | - | - | - | 2,730 |
| 3b.1.1.15 | Reactor building | - | - | - | - | - | - | 351 | 53 | 403 | 363 | - | 40 | - | - | - | - | - | - | - | - | 2,730 |
| 3b.1.1 | Total | - | - | - | - | - | - | 4,208 | 631 | 4,839 | 4,376 | - | 463 | - | - | - | - | - | - | - | - | 32,741 |
| 3b.1 | Subtotal Period 3b Activity Costs | - | - | - | - | - | - | 4,208 | 631 | 4,839 | 4,376 | - | 463 | - | - | - | - | - | - | - | - | 32,741 |
| Period 3b Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3b.3.1 | Decon equipment | 1,055 | - | - | - | - | - | - | 158 | 1,213 | 1,213 | - | - | - | - | - | - | - | - | - | - | - |
| 3b.3.2 | DOC staff relocation expenses | - | - | - | - | - | - | 1,264 | 190 | 1,454 | 1,454 | - | - | - | - | - | - | - | - | - | - | - |
| 3b.3.3 | Pipe cutting equipment | - | 1,200 | - | - | - | - | - | 180 | 1,380 | 1,380 | - | - | - | - | - | - | - | - | - | - | - |
| 3b.3.4 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 2,839 | 426 | 3,265 | - | 3,265 | - | - | - | - | - | - | - | - | - | - |
| 3b.3 | Subtotal Period 3b Collateral Costs | 1,055 | 1,200 | - | - | - | - | 4,103 | 954 | 7,311 | 4,047 | 3,265 | - | - | - | - | - | - | - | - | - | - |
| Period 3b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3b.4.1 | Decon supplies | 39 | - | - | - | - | - | - | 10 | 48 | 48 | - | - | - | - | - | - | - | - | - | - | - |
| 3b.4.2 | Insurance | - | - | - | - | - | - | 351 | 35 | 386 | 386 | - | - | - | - | - | - | - | - | - | - | - |
| 3b.4.3 | Property taxes | - | - | - | - | - | - | 1,614 | 161 | 1,776 | 1,483 | 293 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.4 | Health physics supplies | - | 295 | - | - | - | - | - | 74 | 369 | 369 | - | - | - | - | - | - | - | - | - | - | - |
| 3b.4.5 | Heavy equipment rental | - | 375 | - | - | - | - | - | 56 | 432 | 432 | - | - | - | - | - | - | - | - | - | - | - |
| 3b.4.6 | Disposal of DAW generated | - | - | 6 | 3 | - | 24 | - | 7 | 40 | 40 | - | - | - | 291 | - | - | - | - | 5,814 | 9 | - |
| 3b.4.7 | Plant energy budget | - | - | - | - | - | - | 906 | 136 | 1,042 | 1,042 | - | - | - | - | - | - | - | - | - | - | - |

**Monticello Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table I
Monticello Nuclear Generating Plant
SAFSTOR Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|--|---|--------------|--------------|-----------------|-----------------|---------------------------|---------------------|---------------|-------------------|----------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|----------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| Period 3b Period-Dependent Costs (continued) | | | | | | | | | | | | | | | | | | | | | | |
| 3b.4.8 | NRC ISFSI Fees | - | - | - | - | - | - | 25 | 3 | 28 | - | 28 | - | - | - | - | - | - | - | - | - | |
| 3b.4.9 | NRC Fees | - | - | - | - | - | - | 167 | 17 | 183 | 183 | - | - | - | - | - | - | - | - | - | - | |
| 3b.4.10 | Emergency Planning Fees | - | - | - | - | - | - | 74 | 7 | 81 | - | 81 | - | - | - | - | - | - | - | - | - | |
| 3b.4.11 | Fixed Overhead | - | - | - | - | - | - | 1,305 | 196 | 1,500 | 1,500 | - | - | - | - | - | - | - | - | - | - | |
| 3b.4.12 | ISFSI Operating Costs | - | - | - | - | - | - | 56 | 8 | 64 | - | 64 | - | - | - | - | - | - | - | - | - | |
| 3b.4.13 | Railroad Track Maintenance | - | - | - | - | - | - | 62 | 9 | 72 | 72 | - | - | - | - | - | - | - | - | - | - | |
| 3b.4.14 | Security Staff Cost | - | - | - | - | - | - | 2,338 | 351 | 2,689 | 2,547 | 143 | - | - | - | - | - | - | - | - | 34,485 | |
| 3b.4.15 | DOC Staff Cost | - | - | - | - | - | - | 5,344 | 802 | 6,146 | 6,146 | - | - | - | - | - | - | - | - | - | 58,080 | |
| 3b.4.16 | Utility Staff Cost | - | - | - | - | - | - | 8,385 | 1,258 | 9,643 | 9,055 | 588 | - | - | - | - | - | - | - | - | 129,644 | |
| 3b.4 | Subtotal Period 3b Period-Dependent Costs | 39 | 671 | 6 | 3 | - | 24 | 20,628 | 3,129 | 24,499 | 23,302 | 1,197 | - | - | 291 | - | - | - | - | 5,814 | 9 | 222,210 |
| 3b.0 | TOTAL PERIOD 3b COST | 1,093 | 1,871 | 6 | 3 | - | 24 | 28,938 | 4,714 | 36,649 | 31,725 | 4,462 | 463 | - | 291 | - | - | - | - | 5,814 | 9 | 254,951 |
| PERIOD 3 TOTALS | | 1,093 | 3,162 | 44 | 37 | 14 | 66 | 86,795 | 14,316 | 105,528 | 90,739 | 13,740 | 1,049 | 43 | 806 | - | - | - | - | 21,379 | 30,688 | 668,425 |
| PERIOD 4a - Large Component Removal | | | | | | | | | | | | | | | | | | | | | | |
| Period 4a Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Nuclear Steam Supply System Removal | | | | | | | | | | | | | | | | | | | | | | |
| 4a.1.1.1 | Recirculation System Piping & Valves | 23 | 85 | 27 | 32 | 185 | 264 | - | 134 | 750 | 750 | - | - | 676 | 715 | - | - | - | - | 94,867 | 1,594 | - |
| 4a.1.1.2 | Recirculation Pumps & Motors | 8 | 56 | 16 | 37 | 252 | 270 | - | 131 | 771 | 771 | - | - | 568 | 473 | - | - | - | - | 112,200 | 1,049 | - |
| 4a.1.1.3 | CRDMs & NIs Removal | 41 | 801 | 415 | 98 | - | 1,130 | - | 560 | 3,045 | 3,045 | - | - | - | 3,741 | - | - | - | - | 213,700 | 12,506 | - |
| 4a.1.1.4 | Reactor Vessel Internals | 139 | 6,098 | 11,330 | 1,029 | - | 25,657 | 278 | 20,603 | 65,135 | 65,135 | - | - | - | 2,943 | 1,628 | 600 | - | - | 337,343 | 22,415 | 1,055 |
| 4a.1.1.5 | Reactor Vessel | - | 8,498 | 1,818 | 837 | - | 6,301 | 278 | 10,229 | 27,961 | 27,961 | - | - | - | 17,823 | - | - | - | - | 1,110,260 | 22,415 | 1,055 |
| 4a.1.1 | Totals | 211 | 15,538 | 13,605 | 2,034 | 438 | 33,622 | 557 | 31,657 | 97,662 | 97,662 | - | - | 1,244 | 25,695 | 1,628 | 600 | - | - | 1,868,371 | 59,979 | 2,110 |
| Removal of Major Equipment | | | | | | | | | | | | | | | | | | | | | | |
| 4a.1.2 | Main Turbine/Generator | - | 340 | 1,356 | 521 | 6,139 | 439 | - | 1,330 | 10,126 | 10,126 | - | - | 24,835 | 1,383 | - | - | - | - | 1,577,959 | 4,796 | - |
| 4a.1.3 | Main Condensers | - | 1,207 | 360 | 194 | 3,225 | 244 | - | 912 | 6,142 | 6,142 | - | - | 17,396 | 727 | - | - | - | - | 828,955 | 16,823 | - |
| Cascading Costs from Clean Building Demolition | | | | | | | | | | | | | | | | | | | | | | |
| 4a.1.4.1 | Reactor Building | - | 332 | - | - | - | - | - | 50 | 381 | 381 | - | - | - | - | - | - | - | - | - | 2,217 | - |
| 4a.1.4.2 | Radwaste | - | 25 | - | - | - | - | - | 4 | 28 | 28 | - | - | - | - | - | - | - | - | - | 127 | - |
| 4a.1.4.3 | Turbine | - | 127 | - | - | - | - | - | 19 | 146 | 146 | - | - | - | - | - | - | - | - | - | 1,254 | - |
| 4a.1.4 | Totals | - | 483 | - | - | - | - | - | 72 | 556 | 556 | - | - | - | - | - | - | - | - | - | 3,598 | - |
| Disposal of Plant Systems | | | | | | | | | | | | | | | | | | | | | | |
| 4a.1.5.1 | Automatic Press Relief | - | 106 | 2 | 10 | 182 | - | - | 56 | 356 | 356 | - | - | 1,088 | - | - | - | - | - | 44,184 | 1,468 | - |
| 4a.1.5.2 | Chemistry Sampling | - | 24 | 0 | 2 | 35 | - | - | 12 | 73 | 73 | - | - | 207 | - | - | - | - | - | 8,422 | 356 | - |
| 4a.1.5.3 | Chemistry Sampling - Insulated | - | 2 | 0 | 0 | 0 | - | - | 0 | 2 | 2 | - | - | 1 | - | - | - | - | - | 61 | 25 | - |
| 4a.1.5.4 | Circulating Water - RCA | - | 207 | 14 | 62 | 1,114 | - | - | 230 | 1,626 | 1,626 | - | - | 6,656 | - | - | - | - | - | 270,307 | 2,860 | - |
| 4a.1.5.5 | Combustible Gas Control - Insul - RCA | - | 29 | 0 | 2 | 36 | - | - | 13 | 80 | 80 | - | - | 212 | - | - | - | - | - | 8,617 | 378 | - |
| 4a.1.5.6 | Combustible Gas Control - RCA | - | 18 | 1 | 3 | 48 | - | - | 12 | 81 | 81 | - | - | 285 | - | - | - | - | - | 11,577 | 245 | - |
| 4a.1.5.7 | Condensate & Feedwater | - | 888 | 60 | 281 | 5,046 | - | - | 1,027 | 7,303 | 7,303 | - | - | 30,157 | - | - | - | - | - | 1,224,704 | 12,501 | - |
| 4a.1.5.8 | Condensate & Feedwater - Insulated | - | 444 | 12 | 55 | 980 | - | - | 267 | 1,757 | 1,757 | - | - | 5,855 | - | - | - | - | - | 237,764 | 6,185 | - |
| 4a.1.5.9 | Condensate Demin | - | 494 | 9 | 44 | 792 | - | - | 250 | 1,590 | 1,590 | - | - | 4,735 | - | - | - | - | - | 192,293 | 6,784 | - |
| 4a.1.5.10 | Condensate Storage | - | 657 | 16 | 77 | 1,378 | - | - | 384 | 2,512 | 2,512 | - | - | 8,237 | - | - | - | - | - | 334,489 | 9,265 | - |
| 4a.1.5.11 | Control Rod Drive | - | 3 | 0 | 0 | 4 | - | - | 1 | 8 | 8 | - | - | 24 | - | - | - | - | - | 976 | 36 | - |
| 4a.1.5.12 | Control Rod Drive Hydraulic | - | 374 | 5 | 23 | 408 | - | - | 159 | 968 | 968 | - | - | 2,440 | - | - | - | - | - | 99,094 | 5,255 | - |
| 4a.1.5.13 | Core Spray | - | 71 | 10 | 48 | 855 | - | - | 154 | 1,138 | 1,138 | - | - | 5,109 | - | - | - | - | - | 207,487 | 1,026 | - |
| 4a.1.5.14 | Core Spray - Insulated | - | 131 | 2 | 11 | 198 | - | - | 64 | 407 | 407 | - | - | 1,184 | - | - | - | - | - | 48,081 | 1,806 | - |
| 4a.1.5.15 | Demin Water - Insulated - RCA | - | 15 | 0 | 1 | 14 | - | - | 6 | 36 | 36 | - | - | 85 | - | - | - | - | - | 3,445 | 181 | - |
| 4a.1.5.16 | Demin Water - RCA | - | 41 | 1 | 2 | 42 | - | - | 17 | 104 | 104 | - | - | 253 | - | - | - | - | - | 10,278 | 508 | - |
| 4a.1.5.17 | Diesel Oil - RCA | - | 2 | 0 | 0 | 4 | - | - | 1 | 7 | 7 | - | - | 23 | - | - | - | - | - | 931 | 25 | - |
| 4a.1.5.18 | Drywell Atmosphere Cooling - RCA | - | 38 | 1 | 5 | 92 | - | - | 24 | 159 | 159 | - | - | 548 | - | - | - | - | - | 22,244 | 550 | - |
| 4a.1.5.19 | EDG Emerg Service Water - Insul - RCA | - | 0 | 0 | 0 | 0 | - | - | 0 | 1 | 1 | - | - | 2 | - | - | - | - | - | 84 | 4 | - |
| 4a.1.5.20 | Electrical - Clean | - | 13 | - | - | - | - | - | 2 | 15 | - | - | 15 | - | - | - | - | - | - | - | 182 | - |
| 4a.1.5.21 | Emergency Service Water - Insul - RCA | - | 21 | 0 | 1 | 23 | - | - | 9 | 55 | 55 | - | - | 137 | - | - | - | - | - | 5,544 | 281 | - |
| 4a.1.5.22 | Emergency Service Water - RCA | - | 2 | 0 | 0 | 2 | - | - | 1 | 5 | 5 | - | - | 13 | - | - | - | - | - | 512 | 22 | - |
| 4a.1.5.23 | GEZIP - RCA | - | 3 | 0 | 1 | 17 | - | - | 4 | 25 | 25 | - | - | 103 | - | - | - | - | - | 4,184 | 48 | - |
| 4a.1.5.24 | Generator Physical Design - RCA | - | 5 | 0 | 0 | 5 | - | - | 2 | 12 | 12 | - | - | 31 | - | - | - | - | - | 1,250 | 67 | - |
| 4a.1.5.25 | H2-O2 Control Analyzing | - | 6 | 0 | 0 | 4 | - | - | 2 | 12 | 12 | - | - | 23 | - | - | - | - | - | 948 | 72 | - |
| 4a.1.5.26 | H2-O2 Control Analyzing - Insulated | - | 6 | 0 | 0 | 4 | - | - | 2 | 12 | 12 | - | - | 23 | - | - | - | - | - | 948 | 72 | - |
| 4a.1.5.27 | High Pressure Coolant Injection | - | 60 | 3 | 12 | 211 | - | - | 49 | 334 | 334 | - | - | 1,262 | - | - | - | - | - | 51,257 | 850 | - |
| 4a.1.5.28 | High Pressure Coolant Injection - Insula | - | 198 | 4 | 21 | 379 | - | - | 110 | 713 | 713 | - | - | 2,266 | - | - | - | - | - | 92,018 | 2,734 | - |
| 4a.1.5.29 | Hydrogen Cooling | - | 8 | - | - | - | - | - | 1 | 10 | - | - | 10 | - | - | - | - | - | - | - | 118 | - |

**Monticello Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table I
Monticello Nuclear Generating Plant
SAFSTOR Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| Disposal of Plant Systems (continued) | | | | | | | | | | | | | | | | | | | | | |
| 4a.1.5.30 | Hydrogen Cooling - RCA | - | 7 | 0 | 0 | 7 | - | - | 3 | 17 | 17 | - | - | 39 | - | - | - | - | 1,600 | 79 | - |
| 4a.1.5.31 | Hydrogen Seal Oil - RCA | - | 17 | 0 | 2 | 32 | - | - | 9 | 60 | 60 | - | - | 189 | - | - | - | - | 7,669 | 212 | - |
| 4a.1.5.32 | Hydrogen Water Chemistry - RCA | - | 24 | 0 | 1 | 23 | - | - | 10 | 59 | 59 | - | - | 140 | - | - | - | - | 5,672 | 304 | - |
| 4a.1.5.33 | Instrument & Service Air - RCA | - | 225 | 4 | 17 | 296 | - | - | 103 | 644 | 644 | - | - | 1,768 | - | - | - | - | 71,810 | 2,733 | - |
| 4a.1.5.34 | Main Condenser | - | 177 | 4 | 18 | 318 | - | - | 95 | 613 | 613 | - | - | 1,903 | - | - | - | - | 77,301 | 2,443 | - |
| 4a.1.5.35 | Main Steam | - | 225 | 6 | 28 | 498 | - | - | 136 | 892 | 892 | - | - | 2,975 | - | - | - | - | 120,806 | 3,122 | - |
| 4a.1.5.36 | Main Turbine | - | 909 | 63 | 298 | 5,335 | - | - | 1,079 | 7,684 | 7,684 | - | - | 31,885 | - | - | - | - | 1,294,866 | 12,952 | - |
| 4a.1.5.37 | Main Turbine - Insulated | - | 193 | 7 | 32 | 579 | - | - | 141 | 952 | 952 | - | - | 3,460 | - | - | - | - | 140,506 | 2,725 | - |
| 4a.1.5.38 | Miscellaneous | - | 38 | 1 | 3 | 51 | - | - | 18 | 110 | 110 | - | - | 302 | - | - | - | - | 12,283 | 556 | - |
| 4a.1.5.39 | Off Gas Recombiner | - | 169 | 6 | 27 | 479 | - | - | 119 | 799 | 799 | - | - | 2,861 | - | - | - | - | 116,194 | 2,387 | - |
| 4a.1.5.40 | Off Gas Recombiner - Insulated | - | 351 | 5 | 22 | 393 | - | - | 150 | 921 | 921 | - | - | 2,350 | - | - | - | - | 95,441 | 4,785 | - |
| 4a.1.5.41 | Post Accident Sampling | - | 23 | 0 | 1 | 16 | - | - | 8 | 48 | 48 | - | - | 99 | - | - | - | - | 4,004 | 306 | - |
| 4a.1.5.42 | Post Accident Sampling - Insulated | - | 15 | 0 | 1 | 11 | - | - | 6 | 33 | 33 | - | - | 67 | - | - | - | - | 2,737 | 190 | - |
| 4a.1.5.43 | RHR Service Water - Insulated - RCA | - | 83 | 3 | 14 | 248 | - | - | 60 | 409 | 409 | - | - | 1,485 | - | - | - | - | 60,293 | 1,125 | - |
| 4a.1.5.44 | RHR Service Water - RCA | - | 4 | 0 | 0 | 6 | - | - | 2 | 12 | 12 | - | - | 35 | - | - | - | - | 1,410 | 57 | - |
| 4a.1.5.45 | Reactor Feedwater Pump Seal | - | 50 | 1 | 3 | 55 | - | - | 21 | 130 | 130 | - | - | 327 | - | - | - | - | 13,295 | 687 | - |
| 4a.1.5.46 | Residual Heat Removal | - | 226 | 58 | 147 | 2,110 | 514 | - | 529 | 3,584 | 3,584 | - | - | 12,609 | 1,519 | - | - | - | 609,174 | 3,282 | - |
| 4a.1.5.47 | Residual Heat Removal - Insulated | - | 500 | 39 | 74 | 851 | 464 | - | 384 | 2,312 | 2,312 | - | - | 5,084 | 1,374 | - | - | - | 294,206 | 7,027 | - |
| 4a.1.5.48 | Rx Core Isolation Cooling | - | 43 | 1 | 3 | 61 | - | - | 21 | 129 | 129 | - | - | 364 | - | - | - | - | 14,781 | 609 | - |
| 4a.1.5.49 | Rx Core Isolation Cooling - Insulated | - | 97 | 1 | 5 | 94 | - | - | 39 | 237 | 237 | - | - | 563 | - | - | - | - | 22,843 | 1,315 | - |
| 4a.1.5.50 | Rx Recirculation | - | 53 | 5 | 4 | 16 | 52 | - | 30 | 161 | 161 | - | - | 96 | 152 | - | - | - | 13,794 | 691 | - |
| 4a.1.5.51 | Snubbers | - | 151 | 1 | 5 | 84 | - | - | 51 | 292 | 292 | - | - | 502 | - | - | - | - | 20,395 | 2,272 | - |
| 4a.1.5.52 | Standby Liquid Control - Insul - RCA | - | 4 | 0 | 0 | 4 | - | - | 2 | 9 | 9 | - | - | 22 | - | - | - | - | 904 | 48 | - |
| 4a.1.5.53 | Standby Liquid Control - RCA | - | 26 | 1 | 2 | 41 | - | - | 13 | 83 | 83 | - | - | 245 | - | - | - | - | 9,969 | 341 | - |
| 4a.1.5.54 | Stator Cooling - RCA | - | 7 | 0 | 1 | 21 | - | - | 5 | 35 | 35 | - | - | 126 | - | - | - | - | 5,135 | 98 | - |
| 4a.1.5.55 | Traversing Incore Probe | - | 3 | 0 | 0 | 0 | 2 | - | 1 | 7 | 7 | - | - | 2 | 5 | - | - | - | 379 | 46 | - |
| 4a.1.5 | Totals | - | 7,490 | 347 | 1,370 | 23,501 | 1,032 | - | 5,894 | 39,634 | 39,610 | - | 24 | 140,459 | 3,050 | - | - | - | 5,899,167 | 104,297 | - |
| 4a.1.6 | Scaffolding in support of decommissioning | - | 2,106 | 22 | 12 | 191 | 31 | - | 567 | 2,929 | 2,929 | - | - | 1,030 | 91 | - | - | - | 52,111 | 19,968 | - |
| 4a.1 | Subtotal Period 4a Activity Costs | 211 | 27,165 | 15,691 | 4,132 | 33,494 | 35,367 | 557 | 40,431 | 157,048 | 157,024 | - | 24 | 184,963 | 30,945 | 1,628 | 600 | - | 10,226,560 | 209,462 | 2,110 |
| Period 4a Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 4a.3.1 | Process decommissioning water waste | 4 | - | 7 | 12 | - | 28 | - | 12 | 63 | 63 | - | - | - | 64 | - | - | - | 3,856 | 13 | - |
| 4a.3.3 | Small tool allowance | - | 267 | - | - | - | - | - | 40 | 307 | 276 | - | 31 | - | - | - | - | - | - | - | - |
| 4a.3.4 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 6,395 | 959 | 7,355 | - | 7,355 | - | - | - | - | - | - | - | - | - |
| 4a.3 | Subtotal Period 4a Collateral Costs | 4 | 267 | 7 | 12 | - | 28 | 6,395 | 1,011 | 7,724 | 339 | 7,355 | 31 | - | 64 | - | - | - | 3,856 | 13 | - |
| Period 4a Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 4a.4.1 | Decon supplies | 87 | - | - | - | - | - | - | 22 | 109 | 109 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.2 | Insurance | - | - | - | - | - | - | 790 | 79 | 869 | 869 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.3 | Property taxes | - | - | - | - | - | - | 3,594 | 359 | 3,953 | 3,293 | 660 | - | - | - | - | - | - | - | - | - |
| 4a.4.4 | Health physics supplies | - | 1,872 | - | - | - | - | - | 468 | 2,340 | 2,340 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.5 | Heavy equipment rental | - | 2,811 | - | - | - | - | - | 422 | 3,232 | 3,232 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.6 | Disposal of DAW generated | - | - | 89 | 46 | - | 370 | - | 108 | 612 | 612 | - | - | - | 4,485 | - | - | - | 89,703 | 146 | - |
| 4a.4.7 | Plant energy budget | - | - | - | - | - | - | 1,938 | 291 | 2,229 | 2,229 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.8 | NRC ISFSI Fees | - | - | - | - | - | - | 57 | 6 | 63 | - | 63 | - | - | - | - | - | - | - | - | - |
| 4a.4.9 | NRC Fees | - | - | - | - | - | - | 544 | 54 | 598 | 598 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.10 | Emergency Planning Fees | - | - | - | - | - | - | 167 | 17 | 183 | - | 183 | - | - | - | - | - | - | - | - | - |
| 4a.4.11 | Fixed Overhead | - | - | - | - | - | - | 2,380 | 357 | 2,737 | 2,737 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.12 | Liquid Radwaste Processing Equipment/Services | - | - | - | - | - | - | 477 | 72 | 549 | 549 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.13 | ISFSI Operating Costs | - | - | - | - | - | - | 126 | 19 | 145 | - | 145 | - | - | - | - | - | - | - | - | - |
| 4a.4.14 | Railroad Track Maintenance | - | - | - | - | - | - | 140 | 21 | 162 | 162 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.15 | Remedial Actions Surveys | - | - | - | - | - | - | 1,258 | 189 | 1,447 | 1,447 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.16 | Security Staff Cost | - | - | - | - | - | - | 6,666 | 1,000 | 7,666 | 5,734 | 1,932 | - | - | - | - | - | - | - | - | 101,051 |
| 4a.4.17 | DOC Staff Cost | - | - | - | - | - | - | 14,604 | 2,191 | 16,795 | 16,795 | - | - | - | - | - | - | - | - | - | 161,214 |
| 4a.4.18 | Utility Staff Cost | - | - | - | - | - | - | 19,141 | 2,871 | 22,012 | 20,691 | 1,321 | - | - | - | - | - | - | - | - | 294,391 |
| 4a.4 | Subtotal Period 4a Period-Dependent Costs | 87 | 4,683 | 89 | 46 | - | 370 | 51,884 | 8,545 | 65,702 | 61,399 | 4,304 | - | - | 4,485 | - | - | - | 89,703 | 146 | 556,657 |
| 4a.0 | TOTAL PERIOD 4a COST | 302 | 32,114 | 15,787 | 4,190 | 33,494 | 35,765 | 58,836 | 49,986 | 230,475 | 218,761 | 11,658 | 55 | 184,963 | 35,494 | 1,628 | 600 | - | 10,320,120 | 209,621 | 558,767 |
| PERIOD 4b - Site Decontamination | | | | | | | | | | | | | | | | | | | | | |
| Period 4b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| 4b.1.1 | Remove spent fuel racks | 591 | 58 | 103 | 149 | - | 2,572 | - | 986 | 4,459 | 4,459 | - | - | - | 7,653 | - | - | - | 486,170 | 906 | - |

**Monticello Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table I
Monticello Nuclear Generating Plant
SAFSTOR Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|-----------------------------------|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|--------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| Disposal of Plant Systems | | | | | | | | | | | | | | | | | | | | | | |
| 4b.1.2.1 | ALARA/Radiological | - | 16 | 0 | 0 | 8 | - | - | 5 | 30 | 30 | - | - | 49 | - | - | - | - | - | 1,987 | 247 | - |
| 4b.1.2.2 | Alternate N2 - RCA | - | 16 | 0 | 1 | 16 | - | - | 7 | 40 | 40 | - | - | 93 | - | - | - | - | - | 3,765 | 185 | - |
| 4b.1.2.3 | Cranes/Heavy Loads/Rigging - RCA | - | 3 | 0 | 1 | 17 | - | - | 4 | 25 | 25 | - | - | 103 | - | - | - | - | - | 4,184 | 48 | - |
| 4b.1.2.4 | Decontamination Projects | - | 1 | 0 | 0 | 1 | - | - | 0 | 2 | 2 | - | - | 3 | - | - | - | - | - | 125 | 15 | - |
| 4b.1.2.5 | Electrical - Contaminated | - | 400 | 5 | 23 | 421 | - | - | 167 | 1,016 | 1,016 | - | - | 2,514 | - | - | - | - | - | 102,112 | 5,633 | - |
| 4b.1.2.6 | Electrical - Contaminated Fuel Pool | - | 42 | 1 | 2 | 42 | - | - | 17 | 105 | 105 | - | - | 253 | - | - | - | - | - | 10,272 | 592 | - |
| 4b.1.2.7 | Electrical - Decontam. Fuel Pool Area | - | 297 | 5 | 23 | 411 | - | - | 140 | 876 | 876 | - | - | 2,457 | - | - | - | - | - | 99,783 | 4,090 | - |
| 4b.1.2.8 | Electrical - Decontaminated | - | 2,698 | 48 | 218 | 3,906 | - | - | 1,298 | 8,167 | 8,167 | - | - | 23,344 | - | - | - | - | - | 948,013 | 37,107 | - |
| 4b.1.2.9 | Fire - RCA | - | 101 | 1 | 6 | 103 | - | - | 42 | 253 | 253 | - | - | 614 | - | - | - | - | - | 24,917 | 1,324 | - |
| 4b.1.2.10 | Fire - RCA - Fuel Pool Area | - | 11 | 0 | 1 | 10 | - | - | 4 | 26 | 26 | - | - | 62 | - | - | - | - | - | 2,499 | 143 | - |
| 4b.1.2.11 | Fuel Pool Cooling & Cleanup | - | 387 | 20 | 33 | 343 | 241 | - | 216 | 1,241 | 1,241 | - | - | 2,051 | 712 | - | - | - | - | 128,918 | 5,363 | - |
| 4b.1.2.12 | Fuel Pool Cooling & Cleanup - Insulated | - | 37 | 2 | 3 | 22 | 24 | - | 19 | 107 | 107 | - | - | 130 | 71 | - | - | - | - | 9,830 | 514 | - |
| 4b.1.2.13 | HVAC Ductwork | - | 276 | 6 | 26 | 469 | - | - | 144 | 921 | 921 | - | - | 2,805 | 921 | - | - | - | - | 113,913 | 3,539 | - |
| 4b.1.2.14 | HVAC Ductwork - Fuel Pool Area | - | 31 | 1 | 3 | 52 | - | - | 16 | 102 | 102 | - | - | 312 | - | - | - | - | - | 12,657 | 393 | - |
| 4b.1.2.15 | HVAC/Chilled Water - RCA | - | 324 | 6 | 26 | 461 | - | - | 155 | 971 | 971 | - | - | 2,752 | - | - | - | - | - | 111,779 | 3,985 | - |
| 4b.1.2.16 | HVAC/Chilled Water - RCA Fuel Pool Area | - | 33 | 0 | 2 | 37 | - | - | 14 | 87 | 87 | - | - | 223 | - | - | - | - | - | 9,072 | 397 | - |
| 4b.1.2.17 | Heating & Ventilation | - | 433 | 13 | 59 | 1,060 | - | - | 277 | 1,842 | 1,842 | - | - | 6,334 | - | - | - | - | - | 257,243 | 6,340 | - |
| 4b.1.2.18 | Heating Boiler - Insulated - RCA | - | 3 | 0 | 0 | 4 | - | - | 1 | 9 | 9 | - | - | 26 | - | - | - | - | - | 1,058 | 35 | - |
| 4b.1.2.19 | Instrument & Service Air-RCA-Fuel Pool | - | 29 | 1 | 2 | 45 | - | - | 14 | 91 | 91 | - | - | 267 | - | - | - | - | - | 10,841 | 357 | - |
| 4b.1.2.20 | Liquid Radwaste | - | 621 | 31 | 57 | 703 | 311 | - | 350 | 2,072 | 2,072 | - | - | 4,203 | 915 | - | - | - | - | 229,422 | 8,550 | - |
| 4b.1.2.21 | Makeup Demin - RCA | - | 103 | 3 | 14 | 246 | - | - | 65 | 431 | 431 | - | - | 1,471 | - | - | - | - | - | 59,747 | 1,412 | - |
| 4b.1.2.22 | Non-Essential Diesel Generator - RCA | - | 27 | 3 | 13 | 238 | - | - | 45 | 327 | 327 | - | - | 1,424 | - | - | - | - | - | 57,832 | 395 | - |
| 4b.1.2.23 | Off Gas Holdup | - | 310 | 7 | 34 | 607 | - | - | 174 | 1,133 | 1,133 | - | - | 3,629 | - | - | - | - | - | 147,355 | 4,256 | - |
| 4b.1.2.24 | Primary Containment | - | 411 | 16 | 77 | 1,389 | - | - | 324 | 2,218 | 2,218 | - | - | 8,302 | - | - | - | - | - | 337,148 | 5,729 | - |
| 4b.1.2.25 | Process Radiation Monitors | - | 41 | 0 | 2 | 36 | - | - | 16 | 95 | 95 | - | - | 213 | - | - | - | - | - | 8,667 | 577 | - |
| 4b.1.2.26 | Rx Bldg Closed Cng Water - Insul - RCA | - | 114 | 2 | 9 | 163 | - | - | 54 | 343 | 343 | - | - | 977 | - | - | - | - | - | 39,675 | 1,484 | - |
| 4b.1.2.27 | Rx Bldg Closed Cng Water - RCA | - | 184 | 15 | 66 | 1,187 | - | - | 235 | 1,687 | 1,687 | - | - | 7,093 | - | - | - | - | - | 288,031 | 2,489 | - |
| 4b.1.2.28 | Rx Component Handling Equip | - | 127 | 11 | 24 | 291 | 139 | - | 115 | 708 | 708 | - | - | 1,737 | 415 | - | - | - | - | 96,901 | 1,839 | - |
| 4b.1.2.29 | Rx Pressure Vessel | - | 43 | 5 | 5 | 27 | 57 | - | 30 | 167 | 167 | - | - | 161 | 169 | - | - | - | - | 17,375 | 578 | - |
| 4b.1.2.30 | Rx Water Cleanup | - | 239 | 16 | 15 | 47 | 214 | - | 124 | 655 | 655 | - | - | 278 | 630 | - | - | - | - | 51,819 | 3,264 | - |
| 4b.1.2.31 | Secondary Containment | - | 112 | 3 | 13 | 229 | - | - | 65 | 421 | 421 | - | - | 1,372 | - | - | - | - | - | 55,702 | 1,569 | - |
| 4b.1.2.32 | Service & Seal Water - Insulated - RCA | - | 120 | 2 | 11 | 197 | - | - | 62 | 392 | 392 | - | - | 1,180 | - | - | - | - | - | 47,917 | 1,565 | - |
| 4b.1.2.33 | Service & Seal Water - RCA | - | 159 | 4 | 17 | 303 | - | - | 88 | 570 | 570 | - | - | 1,809 | - | - | - | - | - | 73,453 | 2,016 | - |
| 4b.1.2.34 | Service Air Blower - RCA | - | 15 | 0 | 2 | 34 | - | - | 9 | 62 | 62 | - | - | 206 | - | - | - | - | - | 8,364 | 206 | - |
| 4b.1.2.35 | Solid Radwaste | - | 446 | 21 | 45 | 567 | 223 | - | 261 | 1,563 | 1,563 | - | - | 3,390 | 659 | - | - | - | - | 179,772 | 6,270 | - |
| 4b.1.2.36 | Structures & Buildings | - | 70 | 1 | 4 | 80 | - | - | 30 | 185 | 185 | - | - | 477 | - | - | - | - | - | 19,351 | 1,005 | - |
| 4b.1.2.37 | Wells & Domestic Water | - | 10 | - | - | - | - | - | 1 | 11 | - | - | 11 | - | - | - | - | - | - | - | 144 | - |
| 4b.1.2.38 | Wells & Domestic Water - RCA | - | 52 | 1 | 3 | 57 | - | - | 22 | 136 | 136 | - | - | 342 | - | - | - | - | - | 13,874 | 633 | - |
| 4b.1.2 | Totals | - | 8,342 | 249 | 841 | 13,829 | 1,210 | - | 4,613 | 29,085 | 29,073 | - | 11 | 82,654 | 3,571 | - | - | - | - | 3,585,374 | 114,290 | - |
| 4b.1.3 | Scaffolding in support of decommissioning | - | 3,159 | 33 | 19 | 286 | 46 | - | 850 | 4,394 | 4,394 | - | - | 1,545 | 136 | - | - | - | - | 78,166 | 29,953 | - |
| Decontamination of Site Buildings | | | | | | | | | | | | | | | | | | | | | | |
| 4b.1.4.1 | Reactor Building | 4,668 | 2,596 | 178 | 516 | 8,044 | 1,181 | - | 4,580 | 21,764 | 21,764 | - | - | 48,077 | 7,014 | - | - | - | - | 2,317,670 | 100,718 | - |
| 4b.1.4.2 | Admin | 96 | 5 | 0 | 3 | - | 15 | - | 53 | 172 | 172 | - | - | - | 145 | - | - | - | - | 6,840 | 1,421 | - |
| 4b.1.4.3 | HP/PCI Room | 26 | 25 | 1 | 3 | 20 | 14 | - | 26 | 115 | 115 | - | - | 118 | 125 | - | - | - | - | 10,759 | 703 | - |
| 4b.1.4.4 | Hot Shop | 15 | 4 | 0 | 2 | - | 11 | - | 11 | 43 | 43 | - | - | - | 103 | - | - | - | - | 4,860 | 254 | - |
| 4b.1.4.5 | LLRW Storage & Shipping | 52 | 22 | 2 | 8 | 5 | 45 | - | 45 | 179 | 179 | - | - | 31 | 433 | - | - | - | - | 21,708 | 1,003 | - |
| 4b.1.4.6 | Offgas Stack | 336 | 241 | 7 | 23 | 225 | 82 | - | 286 | 1,199 | 1,199 | - | - | 1,343 | 669 | - | - | - | - | 87,045 | 7,924 | - |
| 4b.1.4.7 | Offgas Storage & Compressor | 36 | 15 | 1 | 6 | 4 | 33 | - | 32 | 128 | 128 | - | - | 25 | 316 | - | - | - | - | 15,948 | 696 | - |
| 4b.1.4.8 | Radwaste | 109 | 54 | 3 | 17 | 29 | 96 | - | 100 | 410 | 410 | - | - | 172 | 910 | - | - | - | - | 49,943 | 2,229 | - |
| 4b.1.4.9 | Radwaste Material Storage Warehouse | 57 | 21 | 2 | 9 | - | 52 | - | 48 | 189 | 189 | - | - | - | 495 | - | - | - | - | 23,400 | 1,062 | - |
| 4b.1.4.10 | Recombiner | 24 | 22 | 1 | 5 | 33 | 24 | - | 30 | 140 | 140 | - | - | 199 | 216 | - | - | - | - | 18,405 | 616 | - |
| 4b.1.4.11 | Turbine | 638 | 314 | 21 | 104 | 215 | 564 | - | 588 | 2,444 | 2,444 | - | - | 1,283 | 5,299 | - | - | - | - | 303,150 | 12,856 | - |
| 4b.1.4.12 | Turbine Building Addition | 53 | 19 | 1 | 8 | - | 45 | - | 44 | 169 | 169 | - | - | - | 434 | - | - | - | - | 20,478 | 968 | - |
| 4b.1.4.13 | Reactor (Post Fuel) | 849 | 2,325 | 172 | 913 | 329 | 5,301 | - | 2,535 | 12,425 | 12,425 | - | - | 1,969 | 50,605 | - | - | - | - | 2,471,778 | 40,860 | - |
| 4b.1.4 | Totals | 6,960 | 5,663 | 390 | 1,617 | 8,904 | 7,465 | - | 8,379 | 39,378 | 39,378 | - | - | 53,216 | 66,764 | - | - | - | - | 5,351,984 | 171,309 | - |
| 4b.1.5 | Prepare/submit License Termination Plan | - | - | - | - | - | - | 526 | 79 | 605 | 605 | - | - | - | - | - | - | - | - | - | - | 4,096 |
| 4b.1.6 | Receive NRC approval of termination plan | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - | - |
| 4b.1 | Subtotal Period 4b Activity Costs | 7,551 | 17,223 | 776 | 2,626 | 23,019 | 11,293 | 526 | 14,907 | 77,921 | 77,910 | - | 11 | 137,414 | 78,124 | - | - | - | - | 9,501,694 | 316,457 | 4,096 |
| Period 4b Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 4b.2.1 | License Termination Survey Planning | - | - | - | - | - | - | 1,458 | 437 | 1,896 | 1,896 | - | - | - | - | - | - | - | - | - | - | 12,480 |
| 4b.2.2 | Excavation of Underground Services | - | 1,972 | - | - | - | - | 376 | 550 | 2,898 | 2,898 | - | - | - | - | - | - | - | - | - | 12,493 | - |
| 4b.2.3 | Operational Equipment | - | - | 23 | 92 | 1,211 | - | - | 198 | 1,524 | 1,524 | - | - | 11,760 | - | - | - | - | | | | |

**Monticello Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table I
Monticello Nuclear Generating Plant
SAFSTOR Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|---|--------------|---------------|-----------------|-----------------|---------------------------|---------------------|----------------|-------------------|----------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| 4b.2 | Subtotal Period 4b Additional Costs | - | 1,972 | 23 | 92 | 1,211 | - | 1,835 | 1,185 | 6,317 | 6,317 | - | - | 11,760 | - | - | - | - | 294,000 | 12,525 | 12,480 |
| Period 4b Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 4b.3.1 | Process decommissioning water waste | 12 | - | 22 | 39 | - | 88 | - | 36 | 196 | 196 | - | - | - | 202 | - | - | - | 12,097 | 39 | - |
| 4b.3.3 | Small tool allowance | - | 397 | - | - | - | - | - | 60 | 456 | 456 | - | - | - | - | - | - | - | - | - | - |
| 4b.3.4 | Decommissioning Equipment Disposition | - | - | 130 | 82 | 1,112 | 178 | - | 237 | 1,739 | 1,739 | - | - | 6,000 | 529 | - | - | - | 303,608 | 147 | - |
| 4b.3.5 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 14,092 | 2,114 | 16,206 | - | 16,206 | - | - | - | - | - | - | - | - | - |
| 4b.3 | Subtotal Period 4b Collateral Costs | 12 | 397 | 152 | 121 | 1,112 | 266 | 14,092 | 2,446 | 18,597 | 2,392 | 16,206 | - | 6,000 | 731 | - | - | - | 315,705 | 186 | - |
| Period 4b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 4b.4.1 | Decon supplies | 1,701 | - | - | - | - | - | - | 425 | 2,126 | 2,126 | - | - | - | - | - | - | - | - | - | - |
| 4b.4.2 | Insurance | - | - | - | - | - | - | 1,434 | 143 | 1,577 | 1,577 | - | - | - | - | - | - | - | - | - | - |
| 4b.4.3 | Property taxes | - | - | - | - | - | - | 6,289 | 629 | 6,917 | 5,721 | 1,197 | - | - | - | - | - | - | - | - | - |
| 4b.4.4 | Health physics supplies | - | 3,050 | - | - | - | - | - | 763 | 3,813 | 3,813 | - | - | - | - | - | - | - | - | - | - |
| 4b.4.5 | Heavy equipment rental | - | 5,239 | - | - | - | - | - | 786 | 6,024 | 6,024 | - | - | - | - | - | - | - | - | - | - |
| 4b.4.6 | Disposal of DAW generated | - | - | 117 | 60 | - | 486 | - | 142 | 805 | 805 | - | - | 5,895 | - | - | - | - | 117,897 | 192 | - |
| 4b.4.7 | Plant energy budget | - | - | - | - | - | - | 2,777 | 417 | 3,194 | 3,194 | - | - | - | - | - | - | - | - | - | - |
| 4b.4.8 | NRC ISFSI Fees | - | - | - | - | - | - | 104 | 10 | 114 | - | 114 | - | - | - | - | - | - | - | - | - |
| 4b.4.9 | NRC Fees | - | - | - | - | - | - | 986 | 99 | 1,085 | 1,085 | - | - | - | - | - | - | - | - | - | - |
| 4b.4.10 | Emergency Planning Fees | - | - | - | - | - | - | 302 | 30 | 332 | - | 332 | - | - | - | - | - | - | - | - | - |
| 4b.4.11 | Fixed Overhead | - | - | - | - | - | - | 4,319 | 648 | 4,967 | 4,967 | - | - | - | - | - | - | - | - | - | - |
| 4b.4.12 | Liquid Radwaste Processing Equipment/Services | - | - | - | - | - | - | 866 | 130 | 996 | 996 | - | - | - | - | - | - | - | - | - | - |
| 4b.4.13 | ISFSI Operating Costs | - | - | - | - | - | - | 228 | 34 | 262 | - | 262 | - | - | - | - | - | - | - | - | - |
| 4b.4.14 | Railroad Track Maintenance | - | - | - | - | - | - | 255 | 38 | 293 | 293 | - | - | - | - | - | - | - | - | - | - |
| 4b.4.15 | Remedial Actions Surveys | - | - | - | - | - | - | 2,283 | 343 | 2,626 | 2,626 | - | - | - | - | - | - | - | - | - | - |
| 4b.4.16 | Security Staff Cost | - | - | - | - | - | - | 12,097 | 1,815 | 13,912 | 3,826 | 10,086 | - | - | - | - | - | - | - | - | 183,371 |
| 4b.4.17 | DOC Staff Cost | - | - | - | - | - | - | 25,916 | 3,887 | 29,803 | 29,803 | - | - | - | - | - | - | - | - | - | 284,065 |
| 4b.4.18 | Utility Staff Cost | - | - | - | - | - | - | 32,869 | 4,930 | 37,799 | 35,380 | 2,419 | - | - | - | - | - | - | - | - | 504,534 |
| 4b.4 | Subtotal Period 4b Period-Dependent Costs | 1,701 | 8,289 | 117 | 60 | - | 486 | 90,726 | 15,269 | 116,648 | 102,236 | 14,411 | - | 5,895 | - | - | - | - | 117,897 | 192 | 971,970 |
| 4b.0 | TOTAL PERIOD 4b COST | 9,264 | 27,881 | 1,067 | 2,898 | 25,343 | 12,044 | 107,179 | 33,806 | 219,483 | 188,855 | 30,617 | 11 | 155,174 | 84,750 | - | - | - | 10,229,300 | 329,361 | 988,546 |
| PERIOD 4f - License Termination | | | | | | | | | | | | | | | | | | | | | |
| Period 4f Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| 4f.1.1 | ORISE confirmatory survey | - | - | - | - | - | - | 166 | 50 | 216 | 216 | - | - | - | - | - | - | - | - | - | - |
| 4f.1.2 | Terminate license | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 4f.1 | Subtotal Period 4f Activity Costs | - | - | - | - | - | - | 166 | 50 | 216 | 216 | - | - | - | - | - | - | - | - | - | - |
| Period 4f Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 4f.2.1 | License Termination Survey | - | - | - | - | - | - | 6,920 | 2,076 | 8,995 | 8,995 | - | - | - | - | - | - | - | - | 95,048 | 6,240 |
| 4f.2 | Subtotal Period 4f Additional Costs | - | - | - | - | - | - | 6,920 | 2,076 | 8,995 | 8,995 | - | - | - | - | - | - | - | - | 95,048 | 6,240 |
| Period 4f Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 4f.3.1 | DOC staff relocation expenses | - | - | - | - | - | - | 1,264 | 190 | 1,454 | 1,454 | - | - | - | - | - | - | - | - | - | - |
| 4f.3.2 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 4,289 | 643 | 4,933 | - | 4,933 | - | - | - | - | - | - | - | - | - |
| 4f.3 | Subtotal Period 4f Collateral Costs | - | - | - | - | - | - | 5,553 | 833 | 6,386 | 1,454 | 4,933 | - | - | - | - | - | - | - | - | - |
| Period 4f Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 4f.4.1 | Insurance | - | - | - | - | - | - | 530 | 53 | 583 | - | 583 | - | - | - | - | - | - | - | - | - |
| 4f.4.2 | Property taxes | - | - | - | - | - | - | 2,198 | 220 | 2,417 | 1,975 | 442 | - | - | - | - | - | - | - | - | - |
| 4f.4.3 | Health physics supplies | - | 708 | - | - | - | - | - | 177 | 884 | 884 | - | - | - | - | - | - | - | - | - | - |
| 4f.4.4 | Disposal of DAW generated | - | - | 7 | 4 | - | 29 | - | 9 | 48 | 48 | - | - | 355 | - | - | - | - | 7,097 | 12 | - |
| 4f.4.5 | Plant energy budget | - | - | - | - | - | - | 274 | 41 | 315 | 315 | - | - | - | - | - | - | - | - | - | - |
| 4f.4.6 | NRC ISFSI Fees | - | - | - | - | - | - | 38 | 4 | 42 | - | 42 | - | - | - | - | - | - | - | - | - |
| 4f.4.7 | NRC Fees | - | - | - | - | - | - | 426 | 43 | 468 | 468 | - | - | - | - | - | - | - | - | - | - |
| 4f.4.8 | Emergency Planning Fees | - | - | - | - | - | - | 112 | 11 | 123 | - | 123 | - | - | - | - | - | - | - | - | - |
| 4f.4.9 | Fixed Overhead | - | - | - | - | - | - | 1,597 | 239 | 1,836 | 1,836 | - | - | - | - | - | - | - | - | - | - |
| 4f.4.10 | ISFSI Operating Costs | - | - | - | - | - | - | 84 | 13 | 97 | - | 97 | - | - | - | - | - | - | - | - | - |
| 4f.4.11 | Railroad Track Maintenance | - | - | - | - | - | - | 94 | 14 | 108 | 108 | - | - | - | - | - | - | - | - | - | - |
| 4f.4.12 | Security Staff Cost | - | - | - | - | - | - | 3,463 | 519 | 3,982 | 1,565 | 2,417 | - | - | - | - | - | - | - | - | 50,932 |
| 4f.4.13 | DOC Staff Cost | - | - | - | - | - | - | 5,393 | 809 | 6,201 | 6,201 | - | - | - | - | - | - | - | - | - | 57,200 |
| 4f.4.14 | Utility Staff Cost | - | - | - | - | - | - | 5,762 | 864 | 6,626 | 5,738 | 888 | - | - | - | - | - | - | - | - | 80,707 |
| 4f.4 | Subtotal Period 4f Period-Dependent Costs | - | 708 | 7 | 4 | - | 29 | 19,969 | 3,016 | 23,732 | 19,140 | 4,593 | - | 355 | - | - | - | - | 7,097 | 12 | 188,838 |
| 4f.0 | TOTAL PERIOD 4f COST | - | 708 | 7 | 4 | - | 29 | 32,608 | 5,974 | 39,330 | 29,805 | 9,526 | - | - | 355 | - | - | - | 7,097 | 95,059 | 195,078 |
| PERIOD 4 TOTALS | | 9,566 | 60,703 | 16,861 | 7,092 | 58,837 | 47,839 | 198,623 | 89,767 | 489,288 | 437,421 | 51,801 | 66 | 340,138 | 120,599 | 1,628 | 600 | - | 20,556,510 | 634,041 | 1,742,391 |

**Monticello Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table I
Monticello Nuclear Generating Plant
SAFSTOR Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|---------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| PERIOD 5b - Site Restoration | | | | | | | | | | | | | | | | | | | | | | |
| Period 5b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Demolition of Remaining Site Buildings | | | | | | | | | | | | | | | | | | | | | | |
| 5b.1.1.1 | Reactor Building | - | 1,971 | - | - | - | - | - | 296 | 2,267 | - | - | 2,267 | - | - | - | - | - | - | - | 13,911 | - |
| 5b.1.1.2 | Condensate Tanks Foundation | - | 10 | - | - | - | - | - | 1 | 11 | - | - | 11 | - | - | - | - | - | - | - | 50 | - |
| 5b.1.1.3 | Discharge Retention Basin | - | 4 | - | - | - | - | - | 1 | 5 | - | - | 5 | - | - | - | - | - | - | - | 25 | - |
| 5b.1.1.4 | HPCI Room | - | 19 | - | - | - | - | - | 3 | 22 | - | - | 22 | - | - | - | - | - | - | - | 97 | - |
| 5b.1.1.5 | Hot Shop | - | 16 | - | - | - | - | - | 2 | 19 | - | - | 19 | - | - | - | - | - | - | - | 177 | - |
| 5b.1.1.6 | Hydrogen & Oxygen Storage | - | 2 | - | - | - | - | - | 0 | 2 | - | - | 2 | - | - | - | - | - | - | - | 19 | - |
| 5b.1.1.7 | LLRW Storage & Shipping | - | 83 | - | - | - | - | - | 12 | 95 | - | - | 95 | - | - | - | - | - | - | - | 662 | - |
| 5b.1.1.8 | MSIV | - | 4 | - | - | - | - | - | 1 | 4 | - | - | 4 | - | - | - | - | - | - | - | 42 | - |
| 5b.1.1.9 | Misc Structures 2017 | - | 1,410 | - | - | - | - | - | 212 | 1,622 | - | - | 1,622 | - | - | - | - | - | - | - | 13,042 | - |
| 5b.1.1.10 | Offgas Stack | - | 108 | - | - | - | - | - | 16 | 124 | - | - | 124 | - | - | - | - | - | - | - | 544 | - |
| 5b.1.1.11 | Offgas Storage & Compressor | - | 39 | - | - | - | - | - | 6 | 45 | - | - | 45 | - | - | - | - | - | - | - | 199 | - |
| 5b.1.1.12 | Radwaste | - | 228 | - | - | - | - | - | 34 | 262 | - | - | 262 | - | - | - | - | - | - | - | 1,220 | - |
| 5b.1.1.13 | Recombiner | - | 128 | - | - | - | - | - | 19 | 147 | - | - | 147 | - | - | - | - | - | - | - | 713 | - |
| 5b.1.1.14 | Security Barrier | - | 186 | - | - | - | - | - | 28 | 214 | - | - | 214 | - | - | - | - | - | - | - | 933 | - |
| 5b.1.1.15 | Structures Greater than 3' Below Grade | - | 2,461 | - | - | - | - | - | 369 | 2,830 | - | - | 2,830 | - | - | - | - | - | - | - | 12,649 | - |
| 5b.1.1.16 | Tank Farm | - | 4 | - | - | - | - | - | 1 | 5 | - | - | 5 | - | - | - | - | - | - | - | 21 | - |
| 5b.1.1.17 | Turbine | - | 1,259 | - | - | - | - | - | 189 | 1,448 | - | - | 1,448 | - | - | - | - | - | - | - | 13,036 | - |
| 5b.1.1.18 | Turbine Building Addition | - | 55 | - | - | - | - | - | 8 | 63 | - | - | 63 | - | - | - | - | - | - | - | 618 | - |
| 5b.1.1.19 | Turbine Pedestal | - | 182 | - | - | - | - | - | 27 | 209 | - | - | 209 | - | - | - | - | - | - | - | 926 | - |
| 5b.1.1 | Totals | - | 8,169 | - | - | - | - | - | 1,225 | 9,394 | - | - | 9,394 | - | - | - | - | - | - | - | 58,885 | - |
| Site Closeout Activities | | | | | | | | | | | | | | | | | | | | | | |
| 5b.1.2 | Grade & landscape site | - | 896 | - | - | - | - | - | 134 | 1,031 | - | - | 1,031 | - | - | - | - | - | - | - | 1,841 | - |
| 5b.1.3 | Final report to NRC | - | - | - | - | - | - | 200 | 30 | 231 | 231 | - | - | - | - | - | - | - | - | - | - | 1,560 |
| 5b.1 | Subtotal Period 5b Activity Costs | - | 9,065 | - | - | - | - | 200 | 1,390 | 10,655 | 231 | - | 10,425 | - | - | - | - | - | - | - | 60,726 | 1,560 |
| Period 5b Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 5b.2.1 | Clean Concrete Disposal | - | 3,322 | - | - | - | - | 13 | 500 | 3,835 | - | - | 3,835 | - | - | - | - | - | - | - | 12 | - |
| 5b.2.2 | Intake Structure Cofferdam | - | 335 | - | - | - | - | - | 50 | 385 | - | - | 385 | - | - | - | - | - | - | - | 2,584 | - |
| 5b.2.3 | Construction Debris | - | - | - | - | - | - | 1,170 | 176 | 1,346 | - | - | 1,346 | - | - | - | - | - | - | - | - | - |
| 5b.2.4 | Backfill | - | 5,583 | - | - | - | - | - | 837 | 6,421 | - | - | 6,421 | - | - | - | - | - | - | - | 5,422 | - |
| 5b.2.5 | Discharge Structure Cofferdam | - | 442 | - | - | - | - | - | 66 | 508 | - | - | 508 | - | - | - | - | - | - | - | 3,552 | - |
| 5b.2.6 | Disposition of Original MPC Canisters | - | 55 | 185 | 954 | - | 5,641 | - | 1,709 | 8,544 | 8,544 | - | - | - | - | 21,097 | - | - | - | 2,505,700 | 337 | - |
| 5b.2 | Subtotal Period 5b Additional Costs | - | 9,737 | 185 | 954 | - | 5,641 | 1,183 | 3,339 | 21,039 | 8,544 | - | 12,495 | - | 21,097 | - | - | - | - | 2,505,700 | 11,907 | - |
| Period 5b Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 5b.3.1 | Small tool allowance | - | 111 | - | - | - | - | - | 17 | 127 | - | - | 127 | - | - | - | - | - | - | - | - | - |
| 5b.3.2 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 10,914 | 1,637 | 12,551 | - | 12,551 | - | - | - | - | - | - | - | - | - | - |
| 5b.3 | Subtotal Period 5b Collateral Costs | - | 111 | - | - | - | - | 10,914 | 1,654 | 12,678 | - | 12,551 | 127 | - | - | - | - | - | - | - | - | - |
| Period 5b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 5b.4.1 | Insurance | - | - | - | - | - | - | 1,220 | 122 | 1,342 | - | 1,342 | - | - | - | - | - | - | - | - | - | - |
| 5b.4.2 | Property taxes | - | - | - | - | - | - | 4,534 | 453 | 4,988 | - | - | 4,988 | - | - | - | - | - | - | - | - | - |
| 5b.4.3 | Heavy equipment rental | - | 5,842 | - | - | - | - | - | 876 | 6,719 | - | - | 6,719 | - | - | - | - | - | - | - | - | - |
| 5b.4.4 | Plant energy budget | - | - | - | - | - | - | 315 | 47 | 362 | - | 362 | - | - | - | - | - | - | - | - | - | - |
| 5b.4.5 | NRC ISFSI Fees | - | - | - | - | - | - | 414 | 41 | 456 | - | 456 | - | - | - | - | - | - | - | - | - | - |
| 5b.4.6 | Emergency Planning Fees | - | - | - | - | - | - | 257 | 26 | 283 | - | 283 | - | - | - | - | - | - | - | - | - | - |
| 5b.4.7 | Fixed Overhead | - | - | - | - | - | - | 1,122 | 168 | 1,290 | 0 | 860 | 429 | - | - | - | - | - | - | - | - | - |
| 5b.4.8 | ISFSI Operating Costs | - | - | - | - | - | - | 194 | 29 | 223 | - | 223 | - | - | - | - | - | - | - | - | - | - |
| 5b.4.9 | Railroad Track Maintenance | - | - | - | - | - | - | 217 | 33 | 249 | 0 | 150 | 100 | - | - | - | - | - | - | - | - | - |
| 5b.4.10 | Security Staff Cost | - | - | - | - | - | - | 7,971 | 1,196 | 9,167 | 0 | 8,580 | 587 | - | - | - | - | - | - | - | - | 117,235 |
| 5b.4.11 | DOC Staff Cost | - | - | - | - | - | - | 11,729 | 1,759 | 13,489 | - | - | 13,489 | - | - | - | - | - | - | - | - | 122,646 |
| 5b.4.12 | Utility Staff Cost | - | - | - | - | - | - | 7,148 | 1,072 | 8,220 | - | 2,129 | 6,091 | - | - | - | - | - | - | - | - | 101,904 |
| 5b.4 | Subtotal Period 5b Period-Dependent Costs | - | 5,842 | - | - | - | - | 35,122 | 5,823 | 46,787 | 0 | 14,385 | 32,402 | - | - | - | - | - | - | - | - | 341,785 |
| 5b.0 | TOTAL PERIOD 5b COST | - | 24,755 | 185 | 954 | - | 5,641 | 47,419 | 12,205 | 91,160 | 8,775 | 26,936 | 55,449 | - | 21,097 | - | - | - | - | 2,505,700 | 72,633 | 343,345 |
| PERIOD 5c - Fuel Storage Operations/Shipping | | | | | | | | | | | | | | | | | | | | | | |
| Period 5c Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Period 5c Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 5c.3.1 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 142,259 | 21,339 | 163,598 | - | 163,598 | - | - | - | - | - | - | - | - | - | - |

**Monticello Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table I
Monticello Nuclear Generating Plant
SAFSTOR Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|-----------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| 5c.3 | Subtotal Period 5c Collateral Costs | - | - | - | - | - | - | 142,259 | 21,339 | 163,598 | - | 163,598 | - | - | - | - | - | - | - | - | - | - |
| Period 5c Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 5c.4.1 | Insurance | - | - | - | - | - | - | 27,126 | 2,713 | 29,838 | - | 29,838 | - | - | - | - | - | - | - | - | - | - |
| 5c.4.2 | Property taxes | - | - | - | - | - | - | 35,797 | 3,580 | 39,376 | - | 39,376 | - | - | - | - | - | - | - | - | - | - |
| 5c.4.4 | NRC ISFSI Fees | - | - | - | - | - | - | 9,215 | 922 | 10,137 | - | 10,137 | - | - | - | - | - | - | - | - | - | - |
| 5c.4.5 | Emergency Planning Fees | - | - | - | - | - | - | 5,718 | 572 | 6,290 | - | 6,290 | - | - | - | - | - | - | - | - | - | - |
| 5c.4.6 | Fixed Overhead | - | - | - | - | - | - | 8,307 | 1,246 | 9,553 | - | 9,553 | - | - | - | - | - | - | - | - | - | - |
| 5c.4.7 | ISFSI Operating Costs | - | - | - | - | - | - | 4,317 | 648 | 4,964 | - | 4,964 | - | - | - | - | - | - | - | - | - | - |
| 5c.4.8 | Railroad Track Maintenance | - | - | - | - | - | - | 4,823 | 723 | 5,546 | - | 5,546 | - | - | - | - | - | - | - | - | - | - |
| 5c.4.9 | Security Staff Cost | - | - | - | - | - | - | 150,854 | 22,628 | 173,482 | - | 173,482 | - | - | - | - | - | - | - | - | - | 2,165,930 |
| 5c.4.10 | DOC Staff Cost | - | - | - | - | - | - | 11,823 | 1,773 | 13,597 | - | 13,597 | - | - | - | - | - | - | - | - | - | 80,220 |
| 5c.4.11 | Utility Staff Cost | - | - | - | - | - | - | 73,686 | 11,053 | 84,739 | - | 84,739 | - | - | - | - | - | - | - | - | - | 1,062,910 |
| 5c.4 | Subtotal Period 5c Period-Dependent Costs | - | - | - | - | - | - | 331,665 | 45,857 | 377,522 | - | 377,522 | - | - | - | - | - | - | - | - | - | 3,309,059 |
| 5c.0 | TOTAL PERIOD 5c COST | - | - | - | - | - | - | 473,925 | 67,196 | 541,121 | - | 541,121 | - | - | - | - | - | - | - | - | - | 3,309,059 |
| PERIOD 5d - GTCC shipping | | | | | | | | | | | | | | | | | | | | | | |
| Period 5d Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Nuclear Steam Supply System Removal | | | | | | | | | | | | | | | | | | | | | | |
| 5d.1.1.1 | Vessel & Internals GTCC Disposal | - | - | 1,083 | - | - | 4,313 | - | 918 | 6,314 | 6,314 | - | - | - | - | - | - | - | 1,160 | 225,765 | - | - |
| 5d.1.1 | Totals | - | - | 1,083 | - | - | 4,313 | - | 918 | 6,314 | 6,314 | - | - | - | - | - | - | - | 1,160 | 225,765 | - | - |
| 5d.1 | Subtotal Period 5d Activity Costs | - | - | 1,083 | - | - | 4,313 | - | 918 | 6,314 | 6,314 | - | - | - | - | - | - | - | 1,160 | 225,765 | - | - |
| Period 5d Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 5d.3.1 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 28 | 4 | 32 | - | 32 | - | - | - | - | - | - | - | - | - | - |
| 5d.3 | Subtotal Period 5d Collateral Costs | - | - | - | - | - | - | 28 | 4 | 32 | - | 32 | - | - | - | - | - | - | - | - | - | - |
| Period 5d Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 5d.4.1 | Insurance | - | - | - | - | - | - | 27 | 3 | 30 | 30 | - | - | - | - | - | - | - | - | - | - | - |
| 5d.4.2 | Property taxes | - | - | - | - | - | - | 35 | 3 | 38 | 38 | - | - | - | - | - | - | - | - | - | - | - |
| 5d.4.4 | NRC ISFSI Fees | - | - | - | - | - | - | 8 | 1 | 9 | - | 9 | - | - | - | - | - | - | - | - | - | - |
| 5d.4.5 | Emergency Planning Fees | - | - | - | - | - | - | 6 | 1 | 6 | - | 6 | - | - | - | - | - | - | - | - | - | - |
| 5d.4.6 | Fixed Overhead | - | - | - | - | - | - | 8 | 1 | 10 | 10 | - | - | - | - | - | - | - | - | - | - | - |
| 5d.4.7 | Railroad Track Maintenance | - | - | - | - | - | - | 5 | 1 | 6 | 6 | - | - | - | - | - | - | - | - | - | - | - |
| 5d.4.8 | Security Staff Cost | - | - | - | - | - | - | 150 | 23 | 173 | 173 | - | - | - | - | - | - | - | - | - | - | 2,154 |
| 5d.4.9 | Utility Staff Cost | - | - | - | - | - | - | 39 | 6 | 45 | 45 | - | - | - | - | - | - | - | - | - | - | 539 |
| 5d.4 | Subtotal Period 5d Period-Dependent Costs | - | - | - | - | - | - | 278 | 38 | 316 | 301 | 15 | - | - | - | - | - | - | - | - | - | 2,693 |
| 5d.0 | TOTAL PERIOD 5d COST | - | - | 1,083 | - | - | 4,313 | 306 | 960 | 6,661 | 6,615 | 47 | - | - | - | - | - | - | 1,160 | 225,765 | - | 2,693 |
| PERIOD 5e - ISFSI Decontamination | | | | | | | | | | | | | | | | | | | | | | |
| Period 5e Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Period 5e Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 5e.2.1 | License Termination ISFSI | - | 0 | 3 | 33 | - | 283 | 2,086 | 602 | 3,008 | 3,008 | - | - | - | 848 | - | - | - | - | 131,507 | 10,502 | 2,225 |
| 5e.2 | Subtotal Period 5e Additional Costs | - | 0 | 3 | 33 | - | 283 | 2,086 | 602 | 3,008 | 3,008 | - | - | - | 848 | - | - | - | - | 131,507 | 10,502 | 2,225 |
| Period 5e Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 5e.4.1 | Insurance | - | - | - | - | - | - | 118 | 30 | 148 | 148 | - | - | - | - | - | - | - | - | - | - | - |
| 5e.4.2 | Property taxes | - | - | - | - | - | - | 248 | 62 | 310 | 310 | - | - | - | - | - | - | - | - | - | - | - |
| 5e.4.3 | Plant energy budget | - | - | - | - | - | - | 12 | 3 | 15 | 15 | - | - | - | - | - | - | - | - | - | - | - |
| 5e.4.4 | Fixed Overhead | - | - | - | - | - | - | 71 | 18 | 89 | 89 | - | - | - | - | - | - | - | - | - | - | - |
| 5e.4.5 | Railroad Track Maintenance | - | - | - | - | - | - | 41 | 10 | 52 | 52 | - | - | - | - | - | - | - | - | - | - | - |
| 5e.4.6 | Security Staff Cost | - | - | - | - | - | - | 352 | 88 | 440 | 440 | - | - | - | - | - | - | - | - | - | - | 4,999 |
| 5e.4.7 | Utility Staff Cost | - | - | - | - | - | - | 261 | 65 | 326 | 326 | - | - | - | - | - | - | - | - | - | - | 3,792 |
| 5e.4 | Subtotal Period 5e Period-Dependent Costs | - | - | - | - | - | - | 1,104 | 276 | 1,380 | 1,380 | - | - | - | - | - | - | - | - | - | - | 8,792 |
| 5e.0 | TOTAL PERIOD 5e COST | - | 0 | 3 | 33 | - | 283 | 3,190 | 877 | 4,387 | 4,387 | - | - | - | 848 | - | - | - | 131,507 | 10,502 | - | 11,017 |

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**Table I
Monticello Nuclear Generating Plant
SAFSTOR Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|-------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| PERIOD 5f - ISFSI Site Restoration | | | | | | | | | | | | | | | | | | | | | | |
| Period 5f Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Period 5f Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 5f.2.1 | Demolition and Site Restoration of ISFSI | - | 1,564 | - | - | - | - | 256 | 273 | 2,093 | - | - | 2,093 | - | - | - | - | - | - | - | 7,309 | 160 |
| 5f.2 | Subtotal Period 5f Additional Costs | - | 1,564 | - | - | - | - | 256 | 273 | 2,093 | - | - | 2,093 | - | - | - | - | - | - | - | 7,309 | 160 |
| Period 5f Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 5f.3.1 | Small tool allowance | - | 11 | - | - | - | - | - | 2 | 12 | - | - | 12 | - | - | - | - | - | - | - | - | - |
| 5f.3 | Subtotal Period 5f Collateral Costs | - | 11 | - | - | - | - | - | 2 | 12 | - | - | 12 | - | - | - | - | - | - | - | - | - |
| Period 5f Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 5f.4.2 | Property taxes | - | - | - | - | - | - | 127 | 13 | 140 | - | - | 140 | - | - | - | - | - | - | - | - | - |
| 5f.4.3 | Heavy equipment rental | - | 118 | - | - | - | - | - | 18 | 136 | - | - | 136 | - | - | - | - | - | - | - | - | - |
| 5f.4.4 | Plant energy budget | - | - | - | - | - | - | 6 | 1 | 7 | - | - | 7 | - | - | - | - | - | - | - | - | - |
| 5f.4.5 | Fixed Overhead | - | - | - | - | - | - | 37 | 5 | 42 | - | - | 42 | - | - | - | - | - | - | - | - | - |
| 5f.4.6 | Railroad Track Maintenance | - | - | - | - | - | - | 21 | 3 | 24 | - | - | 24 | - | - | - | - | - | - | - | - | - |
| 5f.4.7 | Security Staff Cost | - | - | - | - | - | - | 180 | 27 | 207 | - | - | 207 | - | - | - | - | - | - | - | - | 2,562 |
| 5f.4.8 | Utility Staff Cost | - | - | - | - | - | - | 111 | 17 | 128 | - | - | 128 | - | - | - | - | - | - | - | - | 1,590 |
| 5f.4 | Subtotal Period 5f Period-Dependent Costs | - | 118 | - | - | - | - | 482 | 84 | 685 | - | - | 685 | - | - | - | - | - | - | - | - | 4,151 |
| 5f.0 | TOTAL PERIOD 5f COST | - | 1,693 | - | - | - | - | 738 | 358 | 2,790 | - | - | 2,790 | - | - | - | - | - | - | - | 7,309 | 4,311 |
| PERIOD 5 TOTALS | | - | 26,448 | 1,271 | 987 | - | 10,238 | 525,577 | 81,597 | 646,118 | 19,776 | 568,103 | 58,239 | - | 21,944 | - | - | 1,160 | 2,862,972 | 90,444 | 3,670,425 | |
| TOTAL COST TO DECOMMISSION | | 21,016 | 100,409 | 18,576 | 8,641 | 58,852 | 59,781 | 2,228,133 | 393,023 | 2,888,431 | 1,248,652 | 1,580,426 | 59,354 | 340,180 | 153,182 | 1,628 | 600 | 1,160 | 23,731,310 | 873,407 | 13,370,640 | |

| | | |
|--|--------------------|----------------------------------|
| TOTAL COST TO DECOMMISSION WITH 15.75% CONTINGENCY: | \$2,888,431 | thousands of 2020 dollars |
| TOTAL NRC LICENSE TERMINATION COST IS 43.23% OR: | \$1,248,652 | thousands of 2020 dollars |
| SPENT FUEL MANAGEMENT COST IS 54.72% OR: | \$1,580,426 | thousands of 2020 dollars |
| NON-NUCLEAR DEMOLITION COST IS 2.05% OR: | \$59,354 | thousands of 2020 dollars |
| TOTAL LOW-LEVEL RADIOACTIVE WASTE VOLUME BURIED (EXCLUDING GTCC): | 155,409 | Cubic Feet |
| TOTAL GREATER THAN CLASS C RADWASTE VOLUME GENERATED: | 1,160 | Cubic Feet |
| TOTAL SCRAP METAL REMOVED: | 23,123 | Tons |
| TOTAL CRAFT LABOR REQUIREMENTS: | 873,407 | Man-hours |

End Notes:
n/a - indicates that this activity not charged as decommissioning expense
a - indicates that this activity performed by decommissioning staff
0 - indicates that this value is less than 0.5 but is non-zero
A cell containing " - " indicates a zero value

***Monticello Nuclear Generating Plant
Decommissioning Cost Analysis***

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APPENDIX J

DETAILED COST ANALYSIS

SCENARIO 8: SAFSTOR with 200 Year DFS

**Monticello Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table J
Monticello Nuclear Generating Plant
SAFSTOR Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|--|--|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| PERIOD 1a - Shutdown through Transition | | | | | | | | | | | | | | | | | | | | | |
| Period 1a Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| 1a.1.1 | SAFSTOR site characterization survey | - | - | - | - | - | - | 415 | 124 | 539 | 539 | - | - | - | - | - | - | - | - | - | - |
| 1a.1.2 | Prepare preliminary decommissioning cost | - | - | - | - | - | - | 167 | 25 | 192 | 192 | - | - | - | - | - | - | - | - | - | 1,300 |
| 1a.1.3 | Notification of Cessation of Operations | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.4 | Remove fuel & source material | - | - | - | - | - | - | - | - | n/a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.5 | Notification of Permanent Defueling | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.6 | Deactivate plant systems & process waste | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.7 | Prepare and submit PSDAR | - | - | - | - | - | - | 257 | 39 | 296 | 296 | - | - | - | - | - | - | - | - | - | 2,000 |
| 1a.1.8 | Review plant dwgs & specs. | - | - | - | - | - | - | 167 | 25 | 192 | 192 | - | - | - | - | - | - | - | - | - | 1,300 |
| 1a.1.9 | Perform detailed rad survey | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.10 | Estimate by-product inventory | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| 1a.1.11 | End product description | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| 1a.1.12 | Detailed by-product inventory | - | - | - | - | - | - | 193 | 29 | 222 | 222 | - | - | - | - | - | - | - | - | - | 1,500 |
| 1a.1.13 | Define major work sequence | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| 1a.1.14 | Perform SER and EA | - | - | - | - | - | - | 398 | 60 | 458 | 458 | - | - | - | - | - | - | - | - | - | 3,100 |
| 1a.1.15 | Prepare/submit Defueled Technical Specifications | - | - | - | - | - | - | 964 | 145 | 1,108 | 1,108 | - | - | - | - | - | - | - | - | - | 7,500 |
| 1a.1.16 | Perform Site-Specific Cost Study | - | - | - | - | - | - | 643 | 96 | 739 | 739 | - | - | - | - | - | - | - | - | - | 5,000 |
| 1a.1.17 | Prepare/submit Irradiated Fuel Management Plan | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| Activity Specifications | | | | | | | | | | | | | | | | | | | | | |
| 1a.1.18.1 | Prepare plant and facilities for SAFSTOR | - | - | - | - | - | - | 632 | 95 | 727 | 727 | - | - | - | - | - | - | - | - | - | 4,920 |
| 1a.1.18.2 | Plant systems | - | - | - | - | - | - | 536 | 80 | 616 | 616 | - | - | - | - | - | - | - | - | - | 4,167 |
| 1a.1.18.3 | Plant structures and buildings | - | - | - | - | - | - | 401 | 60 | 461 | 461 | - | - | - | - | - | - | - | - | - | 3,120 |
| 1a.1.18.4 | Waste management | - | - | - | - | - | - | 257 | 39 | 296 | 296 | - | - | - | - | - | - | - | - | - | 2,000 |
| 1a.1.18.5 | Facility and site dormancy | - | - | - | - | - | - | 257 | 39 | 296 | 296 | - | - | - | - | - | - | - | - | - | 2,000 |
| 1a.1.18 | Total | - | - | - | - | - | - | 2,083 | 312 | 2,395 | 2,395 | - | - | - | - | - | - | - | - | - | 16,207 |
| Detailed Work Procedures | | | | | | | | | | | | | | | | | | | | | |
| 1a.1.19.1 | Plant systems | - | - | - | - | - | - | 152 | 23 | 175 | 175 | - | - | - | - | - | - | - | - | - | 1,183 |
| 1a.1.19.2 | Facility closeout & dormancy | - | - | - | - | - | - | 154 | 23 | 177 | 177 | - | - | - | - | - | - | - | - | - | 1,200 |
| 1a.1.19 | Total | - | - | - | - | - | - | 306 | 46 | 352 | 352 | - | - | - | - | - | - | - | - | - | 2,383 |
| 1a.1.20 | Procure vacuum drying system | - | - | - | - | - | - | 13 | 2 | 15 | 15 | - | - | - | - | - | - | - | - | - | 100 |
| 1a.1.21 | Drain/de-energize non-cont. systems | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.22 | Drain & dry NSSS | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.23 | Drain/de-energize contaminated systems | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.24 | Decon/secure contaminated systems | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1 | Subtotal Period 1a Activity Costs | - | - | - | - | - | - | 6,120 | 980 | 7,100 | 7,100 | - | - | - | - | - | - | - | - | - | 44,390 |
| Period 1a Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 1a.3.1 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 1,323 | 198 | 1,522 | - | 1,522 | - | - | - | - | - | - | - | - | - |
| 1a.3.2 | Retention and Severance | - | - | - | - | - | - | 9,892 | 1,484 | 11,376 | 11,376 | - | - | - | - | - | - | - | - | - | - |
| 1a.3 | Subtotal Period 1a Collateral Costs | - | - | - | - | - | - | 11,215 | 1,682 | 12,897 | 11,376 | 1,522 | - | - | - | - | - | - | - | - | - |
| Period 1a Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 1a.4.1 | Insurance | - | - | - | - | - | - | 2,328 | 233 | 2,561 | 2,561 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.2 | Property taxes | - | - | - | - | - | - | 3,570 | 357 | 3,927 | 3,927 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.3 | Health physics supplies | - | 614 | - | - | - | - | - | 153 | 767 | 767 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.4 | Heavy equipment rental | - | 753 | - | - | - | - | - | 113 | 866 | 866 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.5 | Disposal of DAW generated | - | - | 12 | 6 | - | 50 | - | 15 | 83 | 83 | - | - | 610 | - | - | - | - | 12,190 | 20 | - |
| 1a.4.6 | Plant energy budget | - | - | - | - | - | - | 1,817 | 272 | 2,089 | 2,089 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.7 | NRC Fees | - | - | - | - | - | - | 892 | 89 | 981 | 981 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.8 | Emergency Planning Fees | - | - | - | - | - | - | 3,428 | 343 | 3,770 | - | 3,770 | - | - | - | - | - | - | - | - | - |
| 1a.4.9 | Fixed Overhead | - | - | - | - | - | - | 2,616 | 392 | 3,009 | 3,009 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.10 | Spent Fuel Pool O&M | - | - | - | - | - | - | 845 | 127 | 971 | - | 971 | - | - | - | - | - | - | - | - | - |
| 1a.4.11 | ISFSI Operating Costs | - | - | - | - | - | - | 112 | 17 | 129 | - | 129 | - | - | - | - | - | - | - | - | - |
| 1a.4.12 | Railroad Track Maintenance | - | - | - | - | - | - | 125 | 19 | 144 | 144 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.13 | Security Staff Cost | - | - | - | - | - | - | 16,372 | 2,456 | 18,827 | 18,827 | - | - | - | - | - | - | - | - | - | 245,440 |
| 1a.4.14 | Utility Staff Cost | - | - | - | - | - | - | 27,285 | 4,093 | 31,378 | 31,378 | - | - | - | - | - | - | - | - | - | 422,240 |
| 1a.4 | Subtotal Period 1a Period-Dependent Costs | - | 1,367 | 12 | 6 | - | 50 | 59,389 | 8,679 | 69,502 | 64,632 | 4,870 | - | 610 | - | - | - | - | 12,190 | 20 | 667,680 |
| 1a.0 | TOTAL PERIOD 1a COST | - | 1,367 | 12 | 6 | - | 50 | 76,724 | 11,341 | 89,500 | 83,108 | 6,392 | - | 610 | - | - | - | - | 12,190 | 20 | 712,070 |

**Monticello Nuclear Generating Plant
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**Table J
Monticello Nuclear Generating Plant
SAFSTOR Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|--|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|---------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| PERIOD 1b - SAFSTOR Limited DECON Activities | | | | | | | | | | | | | | | | | | | | | | |
| Period 1b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Decontamination of Site Buildings | | | | | | | | | | | | | | | | | | | | | | |
| 1b.1.1.1 | Reactor Building | 5,155 | - | - | - | - | - | - | 2,577 | 7,732 | 7,732 | - | - | - | - | - | - | - | - | - | 70,157 | - |
| 1b.1.1.2 | Admin | 95 | - | - | - | - | - | - | 48 | 143 | 143 | - | - | - | - | - | - | - | - | - | 1,357 | - |
| 1b.1.1.3 | HPCI Room | 25 | - | - | - | - | - | - | 13 | 38 | 38 | - | - | - | - | - | - | - | - | - | 350 | - |
| 1b.1.1.4 | Hot Shop | 15 | - | - | - | - | - | - | 7 | 22 | 22 | - | - | - | - | - | - | - | - | - | 208 | - |
| 1b.1.1.5 | LLRW Storage & Shipping | 49 | - | - | - | - | - | - | 25 | 74 | 74 | - | - | - | - | - | - | - | - | - | 705 | - |
| 1b.1.1.6 | Offgas Stack | 326 | - | - | - | - | - | - | 163 | 489 | 489 | - | - | - | - | - | - | - | - | - | 4,575 | - |
| 1b.1.1.7 | Offgas Storage & Compressor | 34 | - | - | - | - | - | - | 17 | 51 | 51 | - | - | - | - | - | - | - | - | - | 488 | - |
| 1b.1.1.8 | Radwaste | 103 | - | - | - | - | - | - | 51 | 154 | 154 | - | - | - | - | - | - | - | - | - | 1,473 | - |
| 1b.1.1.9 | Radwaste Material Storage Warehouse | 54 | - | - | - | - | - | - | 27 | 81 | 81 | - | - | - | - | - | - | - | - | - | 768 | - |
| 1b.1.1.10 | Recombiner | 23 | - | - | - | - | - | - | 11 | 34 | 34 | - | - | - | - | - | - | - | - | - | 323 | - |
| 1b.1.1.11 | Turbine | 600 | - | - | - | - | - | - | 300 | 900 | 900 | - | - | - | - | - | - | - | - | - | 8,583 | - |
| 1b.1.1.12 | Turbine Building Addition | 50 | - | - | - | - | - | - | 25 | 74 | 74 | - | - | - | - | - | - | - | - | - | 709 | - |
| 1b.1.1.13 | Reactor (Post Fuel) | 830 | - | - | - | - | - | - | 415 | 1,245 | 1,245 | - | - | - | - | - | - | - | - | - | 11,337 | - |
| 1b.1.1 | Totals | 7,359 | - | - | - | - | - | - | 3,679 | 11,038 | 11,038 | - | - | - | - | - | - | - | - | - | 101,033 | - |
| 1b.1 | Subtotal Period 1b Activity Costs | 7,359 | - | - | - | - | - | - | 3,679 | 11,038 | 11,038 | - | - | - | - | - | - | - | - | - | 101,033 | - |
| Period 1b Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 1b.2.1 | Spent Fuel Pool Isolation | - | - | - | - | - | - | 12,675 | 1,901 | 14,576 | 14,576 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.2 | Subtotal Period 1b Additional Costs | - | - | - | - | - | - | 12,675 | 1,901 | 14,576 | 14,576 | - | - | - | - | - | - | - | - | - | - | - |
| Period 1b Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 1b.3.1 | Decon equipment | 1,055 | - | - | - | - | - | - | 158 | 1,213 | 1,213 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.3.2 | Process decommissioning water waste | 220 | - | 145 | 258 | - | 588 | - | 310 | 1,522 | 1,522 | - | - | - | 1,351 | - | - | - | - | - | 81,042 | 263 |
| 1b.3.4 | Small tool allowance | - | 126 | - | - | - | - | - | 19 | 145 | 145 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.3.5 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 196 | 29 | 225 | - | 225 | - | - | - | - | - | - | - | - | - | - |
| 1b.3.6 | Retention and Severance | - | - | - | - | - | - | 3,601 | 540 | 4,141 | 4,141 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.3 | Subtotal Period 1b Collateral Costs | 1,274 | 126 | 145 | 258 | - | 588 | 3,796 | 1,057 | 7,246 | 7,021 | 225 | - | - | 1,351 | - | - | - | - | - | 81,042 | 263 |
| Period 1b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 1b.4.1 | Decon supplies | 1,562 | - | - | - | - | - | - | 391 | 1,953 | 1,953 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.2 | Insurance | - | - | - | - | - | - | 580 | 58 | 638 | 638 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.3 | Property taxes | - | - | - | - | - | - | 890 | 89 | 979 | 979 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.4 | Health physics supplies | - | 729 | - | - | - | - | - | 182 | 911 | 911 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.5 | Heavy equipment rental | - | 188 | - | - | - | - | - | 28 | 216 | 216 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.6 | Disposal of DAW generated | - | - | 11 | 6 | - | 46 | - | 13 | 76 | 76 | - | - | - | 555 | - | - | - | - | - | 11,092 | 18 |
| 1b.4.7 | Plant energy budget | - | - | - | - | - | - | 453 | 68 | 521 | 521 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.8 | NRC Fees | - | - | - | - | - | - | 161 | 16 | 177 | 177 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.9 | Emergency Planning Fees | - | - | - | - | - | - | 708 | 71 | 779 | - | 779 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.10 | Fixed Overhead | - | - | - | - | - | - | 652 | 98 | 750 | 750 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.11 | Spent Fuel Pool O&M | - | - | - | - | - | - | 211 | 32 | 242 | - | 242 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.12 | ISFSI Operating Costs | - | - | - | - | - | - | 28 | 4 | 32 | - | 32 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.13 | Railroad Track Maintenance | - | - | - | - | - | - | 31 | 5 | 36 | 36 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.14 | Security Staff Cost | - | - | - | - | - | - | 4,082 | 612 | 4,694 | 4,694 | - | - | - | - | - | - | - | - | - | - | 61,192 |
| 1b.4.15 | Utility Staff Cost | - | - | - | - | - | - | 6,803 | 1,020 | 7,823 | 7,823 | - | - | - | - | - | - | - | - | - | - | 105,271 |
| 1b.4 | Subtotal Period 1b Period-Dependent Costs | 1,562 | 917 | 11 | 6 | - | 46 | 14,599 | 2,687 | 19,828 | 18,775 | 1,053 | - | - | 555 | - | - | - | - | - | 11,092 | 18 |
| 1b.0 | TOTAL PERIOD 1b COST | 10,195 | 1,043 | 156 | 264 | - | 634 | 31,070 | 9,325 | 52,688 | 51,410 | 1,278 | - | - | 1,905 | - | - | - | - | - | 92,135 | 101,314 |
| PERIOD 1c - Preparations for SAFSTOR Dormancy | | | | | | | | | | | | | | | | | | | | | | |
| Period 1c Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| 1c.1.1 | Prepare support equipment for storage | - | 527 | - | - | - | - | - | 79 | 606 | 606 | - | - | - | - | - | - | - | - | - | - | 3,000 |
| 1c.1.2 | Install containment pressure equal. lines | - | 54 | - | - | - | - | - | 8 | 62 | 62 | - | - | - | - | - | - | - | - | - | - | 700 |
| 1c.1.3 | Interim survey prior to dormancy | - | - | - | - | - | - | 733 | 220 | 953 | 953 | - | - | - | - | - | - | - | - | - | - | 12,801 |
| 1c.1.4 | Secure building accesses | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 1c.1.5 | Prepare & submit interim report | - | - | - | - | - | - | 75 | 11 | 86 | 86 | - | - | - | - | - | - | - | - | - | - | 583 |
| 1c.1 | Subtotal Period 1c Activity Costs | - | 581 | - | - | - | - | 808 | 318 | 1,707 | 1,707 | - | - | - | - | - | - | - | - | - | - | 16,501 |
| Period 1c Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 1c.3.1 | Process decommissioning water waste | 161 | - | 107 | 190 | - | 433 | - | 228 | 1,120 | 1,120 | - | - | - | 994 | - | - | - | - | - | 59,653 | 194 |

**Monticello Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table J
Monticello Nuclear Generating Plant
SAFSTOR Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|---|---|---------------|--------------|-----------------|-----------------|---------------------------|---------------------|----------------|-------------------|----------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| 1c.3.3 | Small tool allowance | - | 5 | - | - | - | - | - | 1 | 6 | 6 | - | - | - | - | - | - | - | - | - | - | - |
| 1c.3.4 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 2,539 | 381 | 2,920 | - | 2,920 | - | - | - | - | - | - | - | - | - | - |
| 1c.3.5 | Retention and Severance | - | - | - | - | - | - | 2,734 | 410 | 3,145 | 3,145 | - | - | - | - | - | - | - | - | - | - | - |
| 1c.3 | Subtotal Period 1c Collateral Costs | 161 | 5 | 107 | 190 | - | 433 | 5,273 | 1,020 | 7,190 | 4,270 | 2,920 | - | - | - | 994 | - | - | - | 59,653 | 194 | - |
| Period 1c Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 1c.4.1 | Insurance | - | - | - | - | - | - | 580 | 58 | 638 | 638 | - | - | - | - | - | - | - | - | - | - | - |
| 1c.4.2 | Property taxes | - | - | - | - | - | - | 888 | 89 | 977 | 977 | - | - | - | - | - | - | - | - | - | - | - |
| 1c.4.3 | Health physics supplies | - | 248 | - | - | - | - | - | 62 | 310 | 310 | - | - | - | - | - | - | - | - | - | - | - |
| 1c.4.4 | Heavy equipment rental | - | 188 | - | - | - | - | - | 28 | 216 | 216 | - | - | - | - | - | - | - | - | - | - | - |
| 1c.4.5 | Disposal of DAW generated | - | - | 3 | 2 | - | 13 | - | 4 | 21 | 21 | - | - | - | 152 | - | - | - | - | 3,039 | 5 | - |
| 1c.4.6 | Plant energy budget | - | - | - | - | - | - | 453 | 68 | 521 | 521 | - | - | - | - | - | - | - | - | - | - | - |
| 1c.4.7 | NRC Fees | - | - | - | - | - | - | 161 | 16 | 177 | 177 | - | - | - | - | - | - | - | - | - | - | - |
| 1c.4.8 | Emergency Planning Fees | - | - | - | - | - | - | 708 | 71 | 779 | - | 779 | - | - | - | - | - | - | - | - | - | - |
| 1c.4.9 | Fixed Overhead | - | - | - | - | - | - | 652 | 98 | 750 | 750 | - | - | - | - | - | - | - | - | - | - | - |
| 1c.4.10 | Spent Fuel Pool O&M | - | - | - | - | - | - | 211 | 32 | 242 | - | 242 | - | - | - | - | - | - | - | - | - | - |
| 1c.4.11 | ISFSI Operating Costs | - | - | - | - | - | - | 28 | 4 | 32 | - | 32 | - | - | - | - | - | - | - | - | - | - |
| 1c.4.12 | Railroad Track Maintenance | - | - | - | - | - | - | 31 | 5 | 36 | 36 | - | - | - | - | - | - | - | - | - | - | - |
| 1c.4.13 | Security Staff Cost | - | - | - | - | - | - | 4,082 | 612 | 4,694 | 4,694 | - | - | - | - | - | - | - | - | - | - | 61,192 |
| 1c.4.14 | Utility Staff Cost | - | - | - | - | - | - | 6,803 | 1,020 | 7,823 | 7,823 | - | - | - | - | - | - | - | - | - | - | 105,271 |
| 1c.4 | Subtotal Period 1c Period-Dependent Costs | - | 436 | 3 | 2 | - | 13 | 14,597 | 2,166 | 17,216 | 16,163 | 1,053 | - | - | 152 | - | - | - | - | 3,039 | 5 | 166,463 |
| 1c.0 | TOTAL PERIOD 1c COST | 161 | 1,021 | 110 | 192 | - | 446 | 20,678 | 3,505 | 26,113 | 22,140 | 3,973 | - | - | 1,146 | - | - | - | - | 62,692 | 16,700 | 167,046 |
| PERIOD 1 TOTALS | | 10,357 | 3,431 | 278 | 462 | - | 1,130 | 128,472 | 24,170 | 168,301 | 156,658 | 11,643 | - | - | 3,661 | - | - | - | - | 167,017 | 118,034 | 1,045,579 |
| PERIOD 2a - SAFSTOR Dormancy with Wet Spent Fuel Storage | | | | | | | | | | | | | | | | | | | | | | |
| Period 2a Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| 2a.1.1 | Quarterly Inspection | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - | - |
| 2a.1.2 | Semi-annual environmental survey | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - | - |
| 2a.1.3 | Prepare reports | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - | - |
| 2a.1.4 | Bituminous roof replacement | - | - | - | - | - | - | 155 | 23 | 178 | 178 | - | - | - | - | - | - | - | - | - | - | - |
| 2a.1.5 | Maintenance supplies | - | - | - | - | - | - | 349 | 87 | 437 | 437 | - | - | - | - | - | - | - | - | - | - | - |
| 2a.1 | Subtotal Period 2a Activity Costs | - | - | - | - | - | - | 504 | 111 | 615 | 615 | - | - | - | - | - | - | - | - | - | - | - |
| Period 2a Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 2a.2.1 | Security Modifications | - | - | - | - | - | - | 8,696 | 1,304 | 10,000 | 10,000 | - | - | - | - | - | - | - | - | - | - | - |
| 2a.2 | Subtotal Period 2a Additional Costs | - | - | - | - | - | - | 8,696 | 1,304 | 10,000 | 10,000 | - | - | - | - | - | - | - | - | - | - | - |
| Period 2a Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 2a.3.1 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 141,374 | 21,206 | 162,580 | - | 162,580 | - | - | - | - | - | - | - | - | - | - |
| 2a.3.2 | Retention and Severance | - | - | - | - | - | - | 19,427 | 2,914 | 22,341 | 22,341 | - | - | - | - | - | - | - | - | - | - | - |
| 2a.3 | Subtotal Period 2a Collateral Costs | - | - | - | - | - | - | 160,801 | 24,120 | 184,921 | 22,341 | 162,580 | - | - | - | - | - | - | - | - | - | - |
| Period 2a Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 2a.4.1 | Insurance | - | - | - | - | - | - | 1,761 | 176 | 1,937 | 1,937 | - | - | - | - | - | - | - | - | - | - | - |
| 2a.4.2 | Property taxes | - | - | - | - | - | - | 8,932 | 893 | 9,825 | 9,825 | - | - | - | - | - | - | - | - | - | - | - |
| 2a.4.3 | Health physics supplies | - | 617 | - | - | - | - | - | 154 | 771 | 771 | - | - | - | - | - | - | - | - | - | - | - |
| 2a.4.4 | Disposal of DAW generated | - | - | 11 | 6 | - | 47 | - | 14 | 79 | 79 | - | - | - | 576 | - | - | - | - | 11,523 | 19 | - |
| 2a.4.5 | Plant energy budget | - | - | - | - | - | - | 910 | 136 | 1,046 | 1,046 | - | - | - | - | - | - | - | - | - | - | - |
| 2a.4.6 | NRC Fees | - | - | - | - | - | - | 610 | 61 | 671 | 671 | - | - | - | - | - | - | - | - | - | - | - |
| 2a.4.7 | Emergency Planning Fees | - | - | - | - | - | - | 7,110 | 711 | 7,821 | - | 7,821 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.8 | Fixed Overhead | - | - | - | - | - | - | 5,306 | 796 | 6,102 | 6,102 | - | - | - | - | - | - | - | - | - | - | - |
| 2a.4.9 | Spent Fuel Pool O&M | - | - | - | - | - | - | 2,115 | 317 | 2,432 | - | 2,432 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.10 | ISFSI Operating Costs | - | - | - | - | - | - | 280 | 42 | 322 | - | 322 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.11 | Railroad Track Maintenance | - | - | - | - | - | - | 639 | 96 | 735 | 735 | - | - | - | - | - | - | - | - | - | - | - |
| 2a.4.12 | Security Staff Cost | - | - | - | - | - | - | 37,806 | 5,671 | 43,477 | 31,086 | 12,391 | - | - | - | - | - | - | - | - | - | 562,523 |
| 2a.4.13 | Utility Staff Cost | - | - | - | - | - | - | 13,543 | 2,031 | 15,574 | 12,615 | 2,959 | - | - | - | - | - | - | - | - | - | 205,738 |
| 2a.4 | Subtotal Period 2a Period-Dependent Costs | - | 617 | 11 | 6 | - | 47 | 79,012 | 11,099 | 90,793 | 64,868 | 25,925 | - | - | 576 | - | - | - | - | 11,523 | 19 | 768,261 |
| 2a.0 | TOTAL PERIOD 2a COST | - | 617 | 11 | 6 | - | 47 | 249,013 | 36,634 | 286,328 | 97,823 | 188,505 | - | - | 576 | - | - | - | - | 11,523 | 19 | 768,261 |
| PERIOD 2b - SAFSTOR Dormancy with Dry Spent Fuel Storage | | | | | | | | | | | | | | | | | | | | | | |
| Period 2b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| 2b.1.1 | Quarterly Inspection | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - | - |
| 2b.1.2 | Semi-annual environmental survey | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - | - |

**Monticello Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table J
Monticello Nuclear Generating Plant
SAFSTOR Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| Period 2b Direct Decommissioning Activities (continued) | | | | | | | | | | | | | | | | | | | | | |
| 2b.1.3 | Prepare reports | - | - | - | - | - | - | 3,127 | 469 | 3,596 | 3,596 | - | - | - | - | - | - | - | - | - | - |
| 2b.1.4 | Bituminous roof replacement | - | - | - | - | - | - | 7,065 | 1,766 | 8,831 | 8,831 | - | - | - | - | - | - | - | - | - | - |
| 2b.1.5 | Maintenance supplies | - | - | - | - | - | - | 10,192 | 2,235 | 12,427 | 12,427 | - | - | - | - | - | - | - | - | - | - |
| 2b.1 | Subtotal Period 2b Activity Costs | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Period 2b Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 2b.3.1 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 366,775 | 55,016 | 421,791 | - | 421,791 | - | - | - | - | - | - | - | - | - |
| 2b.3 | Subtotal Period 2b Collateral Costs | - | - | - | - | - | - | 366,775 | 55,016 | 421,791 | - | 421,791 | - | - | - | - | - | - | - | - | - |
| Period 2b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 2b.4.1 | Insurance | - | - | - | - | - | - | 35,606 | 3,561 | 39,167 | 39,167 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.2 | Property taxes | - | - | - | - | - | - | 180,613 | 18,061 | 198,674 | 198,674 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.3 | Health physics supplies | - | 6,047 | - | - | - | - | - | 1,512 | 7,559 | 7,559 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.4 | Disposal of DAW generated | - | - | 111 | 57 | - | 461 | - | 135 | 764 | 764 | - | - | - | 5,595 | - | - | - | 111,903 | 182 | - |
| 2b.4.5 | Plant energy budget | - | - | - | - | - | - | 9,196 | 1,379 | 10,576 | 10,576 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.6 | NRC Fees | - | - | - | - | - | - | 11,515 | 1,152 | 12,667 | 12,667 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.7 | Emergency Planning Fees | - | - | - | - | - | - | 7,506 | 751 | 8,256 | - | 8,256 | - | - | - | - | - | - | - | - | - |
| 2b.4.8 | Fixed Overhead | - | - | - | - | - | - | 10,904 | 1,636 | 12,540 | 12,540 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.9 | ISFSI Operating Costs | - | - | - | - | - | - | 5,666 | 850 | 6,516 | - | 6,516 | - | - | - | - | - | - | - | - | - |
| 2b.4.10 | Railroad Track Maintenance | - | - | - | - | - | - | 6,330 | 950 | 7,280 | 7,280 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.11 | Security Staff Cost | - | - | - | - | - | - | 280,802 | 42,120 | 322,922 | 72,658 | 250,265 | - | - | - | - | - | - | - | - | 3,790,775 |
| 2b.4.12 | Utility Staff Cost | - | - | - | - | - | - | 114,547 | 17,182 | 131,729 | 71,924 | 59,805 | - | - | - | - | - | - | - | - | 1,684,789 |
| 2b.4 | Subtotal Period 2b Period-Dependent Costs | - | 6,047 | 111 | 57 | - | 461 | 662,686 | 89,288 | 758,650 | 433,808 | 324,843 | - | - | 5,595 | - | - | - | 111,903 | 182 | 5,475,563 |
| 2b.0 | TOTAL PERIOD 2b COST | - | 6,047 | 111 | 57 | - | 461 | 1,039,652 | 146,539 | 1,192,868 | 446,234 | 746,634 | - | - | 5,595 | - | - | - | 111,903 | 182 | 5,475,563 |
| PERIOD 2 TOTALS | | - | 6,664 | 122 | 63 | - | 509 | 1,288,665 | 183,173 | 1,479,196 | 544,057 | 935,139 | - | - | 6,171 | - | - | - | 123,426 | 201 | 6,243,824 |
| PERIOD 3a - Reactivate Site Following SAFSTOR Dormancy | | | | | | | | | | | | | | | | | | | | | |
| Period 3a Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| 3a.1.1 | Prepare preliminary decommissioning cost | - | - | - | - | - | - | 167 | 25 | 192 | 192 | - | - | - | - | - | - | - | - | - | 1,300 |
| 3a.1.2 | Review plant dwgs & specs. | - | - | - | - | - | - | 591 | 89 | 680 | 680 | - | - | - | - | - | - | - | - | - | 4,600 |
| 3a.1.3 | Perform detailed rad survey | - | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - |
| 3a.1.4 | End product description | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| 3a.1.5 | Detailed by-product inventory | - | - | - | - | - | - | 167 | 25 | 192 | 192 | - | - | - | - | - | - | - | - | - | 1,300 |
| 3a.1.6 | Define major work sequence | - | - | - | - | - | - | 964 | 145 | 1,108 | 1,108 | - | - | - | - | - | - | - | - | - | 7,500 |
| 3a.1.7 | Perform SER and EA | - | - | - | - | - | - | 398 | 60 | 458 | 458 | - | - | - | - | - | - | - | - | - | 3,100 |
| 3a.1.8 | Perform Site-Specific Cost Study | - | - | - | - | - | - | 643 | 96 | 739 | 739 | - | - | - | - | - | - | - | - | - | 5,000 |
| Activity Specifications | | | | | | | | | | | | | | | | | | | | | |
| 3a.1.9.1 | Re-activate plant & temporary facilities | - | - | - | - | - | - | 947 | 142 | 1,089 | 980 | - | 109 | - | - | - | - | - | - | - | 7,370 |
| 3a.1.9.2 | Plant systems | - | - | - | - | - | - | 536 | 80 | 616 | 554 | - | 62 | - | - | - | - | - | - | - | 4,167 |
| 3a.1.9.3 | Reactor internals | - | - | - | - | - | - | 912 | 137 | 1,049 | 1,049 | - | - | - | - | - | - | - | - | - | 7,100 |
| 3a.1.9.4 | Reactor vessel | - | - | - | - | - | - | 835 | 125 | 961 | 961 | - | - | - | - | - | - | - | - | - | 6,500 |
| 3a.1.9.5 | Sacrificial shield | - | - | - | - | - | - | 64 | 10 | 74 | 74 | - | - | - | - | - | - | - | - | - | 500 |
| 3a.1.9.6 | Moisture separators/reheaters | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| 3a.1.9.7 | Reinforced concrete | - | - | - | - | - | - | 206 | 31 | 236 | 118 | - | 118 | - | - | - | - | - | - | - | 1,600 |
| 3a.1.9.8 | Main Turbine | - | - | - | - | - | - | 268 | 40 | 309 | 309 | - | - | - | - | - | - | - | - | - | 2,088 |
| 3a.1.9.9 | Main Condensers | - | - | - | - | - | - | 268 | 40 | 309 | 309 | - | - | - | - | - | - | - | - | - | 2,088 |
| 3a.1.9.10 | Pressure suppression structure | - | - | - | - | - | - | 257 | 39 | 296 | 296 | - | - | - | - | - | - | - | - | - | 2,000 |
| 3a.1.9.11 | Drywell | - | - | - | - | - | - | 206 | 31 | 236 | 236 | - | - | - | - | - | - | - | - | - | 1,600 |
| 3a.1.9.12 | Plant structures & buildings | - | - | - | - | - | - | 401 | 60 | 461 | 231 | - | 231 | - | - | - | - | - | - | - | 3,120 |
| 3a.1.9.13 | Waste management | - | - | - | - | - | - | 591 | 89 | 680 | 680 | - | - | - | - | - | - | - | - | - | 4,600 |
| 3a.1.9.14 | Facility & site closeout | - | - | - | - | - | - | 116 | 17 | 133 | 67 | - | 67 | - | - | - | - | - | - | - | 900 |
| 3a.1.9 | Total | - | - | - | - | - | - | 5,736 | 860 | 6,597 | 6,011 | - | 586 | - | - | - | - | - | - | - | 44,633 |
| Planning & Site Preparations | | | | | | | | | | | | | | | | | | | | | |
| 3a.1.10 | Prepare dismantling sequence | - | - | - | - | - | - | 308 | 46 | 355 | 355 | - | - | - | - | - | - | - | - | - | 2,400 |
| 3a.1.11 | Plant prep. & temp. svces | - | - | - | - | - | - | 3,500 | 525 | 4,025 | 4,025 | - | - | - | - | - | - | - | - | - | - |
| 3a.1.12 | Design water clean-up system | - | - | - | - | - | - | 180 | 27 | 207 | 207 | - | - | - | - | - | - | - | - | - | 1,400 |
| 3a.1.13 | Rigging/Cont. Cntrl Envlps/tooling/etc. | - | - | - | - | - | - | 2,400 | 360 | 2,760 | 2,760 | - | - | - | - | - | - | - | - | - | - |
| 3a.1.14 | Procure casks/liners & containers | - | - | - | - | - | - | 158 | 24 | 182 | 182 | - | - | - | - | - | - | - | - | - | 1,230 |
| 3a.1 | Subtotal Period 3a Activity Costs | - | - | - | - | - | - | 15,341 | 2,301 | 17,643 | 17,057 | - | 586 | - | - | - | - | - | - | - | 73,463 |
| Period 3a Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 3a.2.1 | Site Characterization | - | - | - | - | - | - | 5,930 | 1,779 | 7,708 | 7,708 | - | - | - | - | - | - | - | - | 30,500 | 10,852 |

**Monticello Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table J
Monticello Nuclear Generating Plant
SAFSTOR Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| Period 3a Additional Costs (continued) | | | | | | | | | | | | | | | | | | | | | |
| 3a.2.2 | Mixed & RCRA Waste | - | - | 28 | 29 | 14 | - | - | 9 | 80 | 80 | - | - | 43 | - | - | - | - | 5,253 | 161 | - |
| 3a.2 | Subtotal Period 3a Additional Costs | - | - | 28 | 29 | 14 | - | 5,930 | 1,788 | 7,788 | 7,788 | - | - | 43 | - | - | - | - | 5,253 | 30,661 | 10,852 |
| Period 3a Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 3a.3.1 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 5,693 | 854 | 6,547 | - | 6,547 | - | - | - | - | - | - | - | - | - |
| 3a.3 | Subtotal Period 3a Collateral Costs | - | - | - | - | - | - | 5,693 | 854 | 6,547 | - | 6,547 | - | - | - | - | - | - | - | - | - |
| Period 3a Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 3a.4.1 | Insurance | - | - | - | - | - | - | 703 | 70 | 774 | 442 | 332 | - | - | - | - | - | - | - | - | - |
| 3a.4.2 | Property taxes | - | - | - | - | - | - | 3,479 | 348 | 3,827 | 3,241 | 586 | - | - | - | - | - | - | - | - | - |
| 3a.4.3 | Health physics supplies | - | 538 | - | - | - | - | - | 135 | 673 | 673 | - | - | - | - | - | - | - | - | - | - |
| 3a.4.4 | Heavy equipment rental | - | 753 | - | - | - | - | - | 113 | 866 | 866 | - | - | - | - | - | - | - | - | - | - |
| 3a.4.5 | Disposal of DAW generated | - | - | 10 | 5 | - | 42 | - | 12 | 70 | 70 | - | - | - | 516 | - | - | - | 10,311 | 17 | - |
| 3a.4.6 | Plant energy budget | - | - | - | - | - | - | 1,817 | 272 | 2,089 | 2,089 | - | - | - | - | - | - | - | - | - | - |
| 3a.4.7 | NRC ISFSI Fees | - | - | - | - | - | - | 28 | 3 | 31 | - | 31 | - | - | - | - | - | - | - | - | - |
| 3a.4.8 | NRC Fees | - | - | - | - | - | - | 335 | 33 | 368 | 368 | - | - | - | - | - | - | - | - | - | - |
| 3a.4.9 | Emergency Planning Fees | - | - | - | - | - | - | 148 | 15 | 163 | - | 163 | - | - | - | - | - | - | - | - | - |
| 3a.4.10 | Fixed Overhead | - | - | - | - | - | - | 2,616 | 392 | 3,009 | 3,009 | - | - | - | - | - | - | - | - | - | - |
| 3a.4.11 | ISFSI Operating Costs | - | - | - | - | - | - | 112 | 17 | 129 | - | 129 | - | - | - | - | - | - | - | - | - |
| 3a.4.12 | Railroad Track Maintenance | - | - | - | - | - | - | 125 | 19 | 144 | 144 | - | - | - | - | - | - | - | - | - | - |
| 3a.4.13 | Security Staff Cost | - | - | - | - | - | - | 4,690 | 703 | 5,393 | 5,107 | 286 | - | - | - | - | - | - | - | - | 69,160 |
| 3a.4.14 | Utility Staff Cost | - | - | - | - | - | - | 16,817 | 2,523 | 19,339 | 18,160 | 1,180 | - | - | - | - | - | - | - | - | 260,000 |
| 3a.4 | Subtotal Period 3a Period-Dependent Costs | - | 1,291 | 10 | 5 | - | 42 | 30,870 | 4,656 | 36,875 | 34,169 | 2,706 | - | - | 516 | - | - | - | 10,311 | 17 | 329,160 |
| 3a.0 | TOTAL PERIOD 3a COST | - | 1,291 | 38 | 34 | 14 | 42 | 57,834 | 9,599 | 68,853 | 59,014 | 9,253 | 586 | 43 | 516 | - | - | - | 15,565 | 30,678 | 413,475 |
| PERIOD 3b - Decommissioning Preparations | | | | | | | | | | | | | | | | | | | | | |
| Period 3b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| Detailed Work Procedures | | | | | | | | | | | | | | | | | | | | | |
| 3b.1.1.1 | Plant systems | - | - | - | - | - | - | 608 | 91 | 700 | 630 | - | 70 | - | - | - | - | - | - | - | 4,733 |
| 3b.1.1.2 | Reactor internals | - | - | - | - | - | - | 514 | 77 | 591 | 591 | - | - | - | - | - | - | - | - | - | 4,000 |
| 3b.1.1.3 | Remaining buildings | - | - | - | - | - | - | 174 | 26 | 200 | 50 | - | 150 | - | - | - | - | - | - | - | 1,350 |
| 3b.1.1.4 | CRD housings & NIs | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| 3b.1.1.5 | Incore instrumentation | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| 3b.1.1.6 | Removal primary containment | - | - | - | - | - | - | 257 | 39 | 296 | 296 | - | - | - | - | - | - | - | - | - | 2,000 |
| 3b.1.1.7 | Reactor vessel | - | - | - | - | - | - | 467 | 70 | 537 | 537 | - | - | - | - | - | - | - | - | - | 3,630 |
| 3b.1.1.8 | Facility closeout | - | - | - | - | - | - | 154 | 23 | 177 | 89 | - | 89 | - | - | - | - | - | - | - | 1,200 |
| 3b.1.1.9 | Sacrificial shield | - | - | - | - | - | - | 154 | 23 | 177 | 177 | - | - | - | - | - | - | - | - | - | 1,200 |
| 3b.1.1.10 | Reinforced concrete | - | - | - | - | - | - | 129 | 19 | 148 | 74 | - | 74 | - | - | - | - | - | - | - | 1,000 |
| 3b.1.1.11 | Main Turbine | - | - | - | - | - | - | 267 | 40 | 307 | 307 | - | - | - | - | - | - | - | - | - | 2,080 |
| 3b.1.1.12 | Main Condensers | - | - | - | - | - | - | 268 | 40 | 309 | 309 | - | - | - | - | - | - | - | - | - | 2,088 |
| 3b.1.1.13 | Moisture separators & reheaters | - | - | - | - | - | - | 257 | 39 | 296 | 296 | - | - | - | - | - | - | - | - | - | 2,000 |
| 3b.1.1.14 | Radwaste building | - | - | - | - | - | - | 351 | 53 | 403 | 363 | - | 40 | - | - | - | - | - | - | - | 2,730 |
| 3b.1.1.15 | Reactor building | - | - | - | - | - | - | 351 | 53 | 403 | 363 | - | 40 | - | - | - | - | - | - | - | 2,730 |
| 3b.1.1 | Total | - | - | - | - | - | - | 4,208 | 631 | 4,839 | 4,376 | - | 463 | - | - | - | - | - | - | - | 32,741 |
| 3b.1 | Subtotal Period 3b Activity Costs | - | - | - | - | - | - | 4,208 | 631 | 4,839 | 4,376 | - | 463 | - | - | - | - | - | - | - | 32,741 |
| Period 3b Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 3b.3.1 | Decon equipment | 1,055 | - | - | - | - | - | - | 158 | 1,213 | 1,213 | - | - | - | - | - | - | - | - | - | - |
| 3b.3.2 | DOC staff relocation expenses | - | - | - | - | - | - | 1,264 | 190 | 1,454 | 1,454 | - | - | - | - | - | - | - | - | - | - |
| 3b.3.3 | Pipe cutting equipment | - | 1,200 | - | - | - | - | - | 180 | 1,380 | 1,380 | - | - | - | - | - | - | - | - | - | - |
| 3b.3.4 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 2,839 | 426 | 3,265 | - | 3,265 | - | - | - | - | - | - | - | - | - |
| 3b.3 | Subtotal Period 3b Collateral Costs | 1,055 | 1,200 | - | - | - | - | 4,103 | 954 | 7,311 | 4,047 | 3,265 | - | - | - | - | - | - | - | - | - |
| Period 3b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 3b.4.1 | Decon supplies | 39 | - | - | - | - | - | - | 10 | 48 | 48 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.2 | Insurance | - | - | - | - | - | - | 351 | 35 | 386 | 386 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.3 | Property taxes | - | - | - | - | - | - | 1,614 | 161 | 1,776 | 1,483 | 293 | - | - | - | - | - | - | - | - | - |
| 3b.4.4 | Health physics supplies | - | 295 | - | - | - | - | - | 74 | 369 | 369 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.5 | Heavy equipment rental | - | 375 | - | - | - | - | - | 56 | 432 | 432 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.6 | Disposal of DAW generated | - | - | 6 | 3 | - | 24 | - | 7 | 40 | 40 | - | - | - | 291 | - | - | - | 5,814 | 9 | - |
| 3b.4.7 | Plant energy budget | - | - | - | - | - | - | 906 | 136 | 1,042 | 1,042 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.8 | NRC ISFSI Fees | - | - | - | - | - | - | 14 | 1 | 15 | - | 15 | - | - | - | - | - | - | - | - | - |
| 3b.4.9 | NRC Fees | - | - | - | - | - | - | 167 | 17 | 183 | 183 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.10 | Emergency Planning Fees | - | - | - | - | - | - | 74 | 7 | 81 | - | 81 | - | - | - | - | - | - | - | - | - |

**Monticello Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table J
Monticello Nuclear Generating Plant
SAFSTOR Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|--|---|--------------|--------------|-----------------|-----------------|---------------------------|---------------------|---------------|-------------------|----------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|----------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| Period 3b Period-Dependent Costs (continued) | | | | | | | | | | | | | | | | | | | | | | |
| 3b.4.11 | Fixed Overhead | - | - | - | - | - | - | 1,305 | 196 | 1,500 | 1,500 | - | - | - | - | - | - | - | - | - | - | |
| 3b.4.12 | ISFSI Operating Costs | - | - | - | - | - | - | 56 | 8 | 64 | - | 64 | - | - | - | - | - | - | - | - | - | |
| 3b.4.13 | Railroad Track Maintenance | - | - | - | - | - | - | 62 | 9 | 72 | 72 | - | - | - | - | - | - | - | - | - | - | |
| 3b.4.14 | Security Staff Cost | - | - | - | - | - | - | 2,338 | 351 | 2,689 | 2,547 | 143 | - | - | - | - | - | - | - | - | - | |
| 3b.4.15 | DOC Staff Cost | - | - | - | - | - | - | 5,344 | 802 | 6,146 | 6,146 | - | - | - | - | - | - | - | - | - | 34,485 | |
| 3b.4.16 | Utility Staff Cost | - | - | - | - | - | - | 8,385 | 1,258 | 9,643 | 9,055 | 588 | - | - | - | - | - | - | - | - | 58,080 | |
| 3b.4 | Subtotal Period 3b Period-Dependent Costs | 39 | 671 | 6 | 3 | - | 24 | 20,616 | 3,128 | 24,487 | 23,302 | 1,185 | - | - | 291 | - | - | - | - | 5,814 | 9 | 222,210 |
| 3b.0 | TOTAL PERIOD 3b COST | 1,093 | 1,871 | 6 | 3 | - | 24 | 28,927 | 4,713 | 36,637 | 31,725 | 4,449 | 463 | - | 291 | - | - | - | - | 5,814 | 9 | 254,951 |
| PERIOD 3 TOTALS | | 1,093 | 3,162 | 44 | 37 | 14 | 66 | 86,761 | 14,312 | 105,490 | 90,739 | 13,702 | 1,049 | 43 | 806 | - | - | - | - | 21,379 | 30,688 | 668,425 |
| PERIOD 4a - Large Component Removal | | | | | | | | | | | | | | | | | | | | | | |
| Period 4a Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Nuclear Steam Supply System Removal | | | | | | | | | | | | | | | | | | | | | | |
| 4a.1.1.1 | Recirculation System Piping & Valves | 23 | 85 | 27 | 32 | 185 | 264 | - | 134 | 750 | 750 | - | - | 676 | 715 | - | - | - | - | 94,867 | 1,594 | - |
| 4a.1.1.2 | Recirculation Pumps & Motors | 8 | 56 | 16 | 37 | 252 | 270 | - | 131 | 771 | 771 | - | - | 568 | 473 | - | - | - | - | 112,200 | 1,049 | - |
| 4a.1.1.3 | CRDMs & NIs Removal | 41 | 801 | 415 | 98 | - | 1,130 | - | 560 | 3,045 | 3,045 | - | - | - | 3,741 | - | - | - | - | 213,700 | 12,506 | - |
| 4a.1.1.4 | Reactor Vessel Internals | 139 | 6,098 | 11,330 | 1,029 | - | 25,657 | 278 | 20,603 | 65,135 | 65,135 | - | - | - | 2,943 | 1,628 | 600 | - | - | 337,343 | 22,415 | 1,055 |
| 4a.1.1.5 | Reactor Vessel | - | 8,498 | 1,818 | 837 | - | 6,301 | 278 | 10,229 | 27,961 | 27,961 | - | - | - | 17,823 | - | - | - | - | 1,110,260 | 22,415 | 1,055 |
| 4a.1.1 | Totals | 211 | 15,538 | 13,605 | 2,034 | 438 | 33,622 | 557 | 31,657 | 97,662 | 97,662 | - | - | 1,244 | 25,695 | 1,628 | 600 | - | - | 1,868,371 | 59,979 | 2,110 |
| Removal of Major Equipment | | | | | | | | | | | | | | | | | | | | | | |
| 4a.1.2 | Main Turbine/Generator | - | 340 | 1,356 | 521 | 6,139 | 439 | - | 1,330 | 10,126 | 10,126 | - | - | 24,835 | 1,383 | - | - | - | - | 1,577,959 | 4,796 | - |
| 4a.1.3 | Main Condensers | - | 1,207 | 360 | 194 | 3,225 | 244 | - | 912 | 6,142 | 6,142 | - | - | 17,396 | 727 | - | - | - | - | 828,955 | 16,823 | - |
| Cascading Costs from Clean Building Demolition | | | | | | | | | | | | | | | | | | | | | | |
| 4a.1.4.1 | Reactor Building | - | 332 | - | - | - | - | - | 50 | 381 | 381 | - | - | - | - | - | - | - | - | - | 2,217 | - |
| 4a.1.4.2 | Radwaste | - | 25 | - | - | - | - | - | 4 | 28 | 28 | - | - | - | - | - | - | - | - | - | 127 | - |
| 4a.1.4.3 | Turbine | - | 127 | - | - | - | - | - | 19 | 146 | 146 | - | - | - | - | - | - | - | - | - | 1,254 | - |
| 4a.1.4 | Totals | - | 483 | - | - | - | - | - | 72 | 556 | 556 | - | - | - | - | - | - | - | - | - | 3,598 | - |
| Disposal of Plant Systems | | | | | | | | | | | | | | | | | | | | | | |
| 4a.1.5.1 | Automatic Press Relief | - | 106 | 2 | 10 | 182 | - | - | 56 | 356 | 356 | - | - | 1,088 | - | - | - | - | - | 44,184 | 1,468 | - |
| 4a.1.5.2 | Chemistry Sampling | - | 24 | 0 | 2 | 35 | - | - | 12 | 73 | 73 | - | - | 207 | - | - | - | - | - | 8,422 | 356 | - |
| 4a.1.5.3 | Chemistry Sampling - Insulated | - | 2 | 0 | 0 | 0 | - | - | 0 | 2 | 2 | - | - | 1 | - | - | - | - | - | 61 | 25 | - |
| 4a.1.5.4 | Circulating Water - RCA | - | 207 | 14 | 62 | 1,114 | - | - | 230 | 1,626 | 1,626 | - | - | 6,656 | - | - | - | - | - | 270,307 | 2,860 | - |
| 4a.1.5.5 | Combustible Gas Control - Insul - RCA | - | 29 | 0 | 2 | 36 | - | - | 13 | 80 | 80 | - | - | 212 | - | - | - | - | - | 8,617 | 378 | - |
| 4a.1.5.6 | Combustible Gas Control - RCA | - | 18 | 1 | 3 | 48 | - | - | 12 | 81 | 81 | - | - | 285 | - | - | - | - | - | 11,577 | 245 | - |
| 4a.1.5.7 | Condensate & Feedwater | - | 888 | 60 | 281 | 5,046 | - | - | 1,027 | 7,303 | 7,303 | - | - | 30,157 | - | - | - | - | - | 1,224,704 | 12,501 | - |
| 4a.1.5.8 | Condensate & Feedwater - Insulated | - | 444 | 12 | 55 | 980 | - | - | 267 | 1,757 | 1,757 | - | - | 5,855 | - | - | - | - | - | 237,764 | 6,185 | - |
| 4a.1.5.9 | Condensate Demin | - | 494 | 9 | 44 | 792 | - | - | 250 | 1,590 | 1,590 | - | - | 4,735 | - | - | - | - | - | 192,293 | 6,784 | - |
| 4a.1.5.10 | Condensate Storage | - | 657 | 16 | 77 | 1,378 | - | - | 384 | 2,512 | 2,512 | - | - | 8,237 | - | - | - | - | - | 334,489 | 9,265 | - |
| 4a.1.5.11 | Control Rod Drive | - | 3 | 0 | 0 | 4 | - | - | 1 | 8 | 8 | - | - | 24 | - | - | - | - | - | 976 | 36 | - |
| 4a.1.5.12 | Control Rod Drive Hydraulic | - | 374 | 5 | 23 | 408 | - | - | 159 | 968 | 968 | - | - | 2,440 | - | - | - | - | - | 99,094 | 5,255 | - |
| 4a.1.5.13 | Core Spray | - | 71 | 10 | 48 | 855 | - | - | 154 | 1,138 | 1,138 | - | - | 5,109 | - | - | - | - | - | 207,487 | 1,026 | - |
| 4a.1.5.14 | Core Spray - Insulated | - | 131 | 2 | 11 | 198 | - | - | 64 | 407 | 407 | - | - | 1,184 | - | - | - | - | - | 48,081 | 1,806 | - |
| 4a.1.5.15 | Demin Water - Insulated - RCA | - | 15 | 0 | 1 | 14 | - | - | 6 | 36 | 36 | - | - | 85 | - | - | - | - | - | 3,445 | 181 | - |
| 4a.1.5.16 | Demin Water - RCA | - | 41 | 1 | 2 | 42 | - | - | 17 | 104 | 104 | - | - | 253 | - | - | - | - | - | 10,278 | 508 | - |
| 4a.1.5.17 | Diesel Oil - RCA | - | 2 | 0 | 0 | 4 | - | - | 1 | 7 | 7 | - | - | 23 | - | - | - | - | - | 931 | 25 | - |
| 4a.1.5.18 | Drywell Atmosphere Cooling - RCA | - | 38 | 1 | 5 | 92 | - | - | 24 | 159 | 159 | - | - | 548 | - | - | - | - | - | 22,244 | 550 | - |
| 4a.1.5.19 | EDG Emerg Service Water - Insul - RCA | - | 0 | 0 | 0 | 0 | - | - | 0 | 1 | 1 | - | - | 2 | - | - | - | - | - | 84 | 4 | - |
| 4a.1.5.20 | Electrical - Clean | - | 13 | - | - | - | - | - | 2 | 15 | - | - | 15 | - | - | - | - | - | - | - | 182 | - |
| 4a.1.5.21 | Emergency Service Water - Insul - RCA | - | 21 | 0 | 1 | 23 | - | - | 9 | 55 | 55 | - | - | 137 | - | - | - | - | - | 5,544 | 281 | - |
| 4a.1.5.22 | Emergency Service Water - RCA | - | 2 | 0 | 0 | 2 | - | - | 1 | 5 | 5 | - | - | 13 | - | - | - | - | - | 512 | 22 | - |
| 4a.1.5.23 | GEZIP - RCA | - | 3 | 0 | 1 | 17 | - | - | 4 | 25 | 25 | - | - | 103 | - | - | - | - | - | 4,184 | 48 | - |
| 4a.1.5.24 | Generator Physical Design - RCA | - | 5 | 0 | 0 | 5 | - | - | 2 | 12 | 12 | - | - | 31 | - | - | - | - | - | 1,250 | 67 | - |
| 4a.1.5.25 | H2-O2 Control Analyzing | - | 6 | 0 | 0 | 4 | - | - | 2 | 12 | 12 | - | - | 23 | - | - | - | - | - | 948 | 72 | - |
| 4a.1.5.26 | H2-O2 Control Analyzing - Insulated | - | 6 | 0 | 0 | 4 | - | - | 2 | 12 | 12 | - | - | 23 | - | - | - | - | - | 948 | 72 | - |
| 4a.1.5.27 | High Pressure Coolant Injection | - | 60 | 3 | 12 | 211 | - | - | 49 | 334 | 334 | - | - | 1,262 | - | - | - | - | - | 51,257 | 850 | - |
| 4a.1.5.28 | High Pressure Coolant Injection - Insula | - | 198 | 4 | 21 | 379 | - | - | 110 | 713 | 713 | - | - | 2,266 | - | - | - | - | - | 92,018 | 2,734 | - |
| 4a.1.5.29 | Hydrogen Cooling | - | 8 | - | - | - | - | - | 1 | 10 | - | - | 10 | - | - | - | - | - | - | - | 118 | - |
| 4a.1.5.30 | Hydrogen Cooling - RCA | - | 7 | 0 | 0 | 7 | - | - | 3 | 17 | 17 | - | - | 39 | - | - | - | - | - | 1,600 | 79 | - |
| 4a.1.5.31 | Hydrogen Seal Oil - RCA | - | 17 | 0 | 2 | 32 | - | - | 9 | 60 | 60 | - | - | 189 | - | - | - | - | - | 7,669 | 212 | - |
| 4a.1.5.32 | Hydrogen Water Chemistry - RCA | - | 24 | 0 | 1 | 23 | - | - | 10 | 59 | 59 | - | - | 140 | - | - | - | - | - | 5,672 | 304 | - |

**Monticello Nuclear Generating Plant
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**Table J
Monticello Nuclear Generating Plant
SAFSTOR Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| Disposal of Plant Systems (continued) | | | | | | | | | | | | | | | | | | | | | |
| 4a.1.5.33 | Instrument & Service Air - RCA | - | 225 | 4 | 17 | 296 | - | - | 103 | 644 | 644 | - | - | 1,768 | - | - | - | - | 71,810 | 2,733 | - |
| 4a.1.5.34 | Main Condenser | - | 177 | 4 | 18 | 318 | - | - | 95 | 613 | 613 | - | - | 1,903 | - | - | - | - | 77,301 | 2,443 | - |
| 4a.1.5.35 | Main Steam | - | 225 | 6 | 28 | 498 | - | - | 136 | 892 | 892 | - | - | 2,975 | - | - | - | - | 120,806 | 3,122 | - |
| 4a.1.5.36 | Main Turbine | - | 909 | 63 | 298 | 5,335 | - | - | 1,079 | 7,684 | 7,684 | - | - | 31,885 | - | - | - | - | 1,294,866 | 12,952 | - |
| 4a.1.5.37 | Main Turbine - Insulated | - | 193 | 7 | 32 | 579 | - | - | 141 | 952 | 952 | - | - | 3,460 | - | - | - | - | 140,506 | 2,725 | - |
| 4a.1.5.38 | Miscellaneous | - | 38 | 1 | 3 | 51 | - | - | 18 | 110 | 110 | - | - | 302 | - | - | - | - | 12,283 | 556 | - |
| 4a.1.5.39 | Off Gas Recombiner | - | 169 | 6 | 27 | 479 | - | - | 119 | 799 | 799 | - | - | 2,861 | - | - | - | - | 116,194 | 2,387 | - |
| 4a.1.5.40 | Off Gas Recombiner - Insulated | - | 351 | 5 | 22 | 393 | - | - | 150 | 921 | 921 | - | - | 2,350 | - | - | - | - | 95,441 | 4,785 | - |
| 4a.1.5.41 | Post Accident Sampling | - | 23 | 0 | 1 | 16 | - | - | 8 | 48 | 48 | - | - | 99 | - | - | - | - | 4,004 | 306 | - |
| 4a.1.5.42 | Post Accident Sampling - Insulated | - | 15 | 0 | 1 | 11 | - | - | 6 | 33 | 33 | - | - | 67 | - | - | - | - | 2,737 | 190 | - |
| 4a.1.5.43 | RHR Service Water - Insulated - RCA | - | 83 | 3 | 14 | 248 | - | - | 60 | 409 | 409 | - | - | 1,485 | - | - | - | - | 60,293 | 1,125 | - |
| 4a.1.5.44 | RHR Service Water - RCA | - | 4 | 0 | 0 | 6 | - | - | 2 | 12 | 12 | - | - | 35 | - | - | - | - | 1,410 | 57 | - |
| 4a.1.5.45 | Reactor Feedwater Pump Seal | - | 50 | 1 | 3 | 55 | - | - | 21 | 130 | 130 | - | - | 327 | - | - | - | - | 13,295 | 687 | - |
| 4a.1.5.46 | Residual Heat Removal | - | 226 | 58 | 147 | 2,110 | 514 | - | 529 | 3,584 | 3,584 | - | - | 12,609 | 1,519 | - | - | - | 609,174 | 3,282 | - |
| 4a.1.5.47 | Residual Heat Removal - Insulated | - | 500 | 39 | 74 | 851 | 464 | - | 384 | 2,312 | 2,312 | - | - | 5,084 | 1,374 | - | - | - | 294,206 | 7,027 | - |
| 4a.1.5.48 | Rx Core Isolation Cooling | - | 43 | 1 | 3 | 61 | - | - | 21 | 129 | 129 | - | - | 364 | - | - | - | - | 14,781 | 609 | - |
| 4a.1.5.49 | Rx Core Isolation Cooling - Insulated | - | 97 | 1 | 5 | 94 | - | - | 39 | 237 | 237 | - | - | 563 | - | - | - | - | 22,843 | 1,315 | - |
| 4a.1.5.50 | Rx Recirculation | - | 53 | 5 | 4 | 16 | 52 | - | 30 | 161 | 161 | - | - | 96 | 152 | - | - | - | 13,794 | 691 | - |
| 4a.1.5.51 | Snubbers | - | 151 | 1 | 5 | 84 | - | - | 51 | 292 | 292 | - | - | 502 | - | - | - | - | 20,395 | 2,272 | - |
| 4a.1.5.52 | Standby Liquid Control - Insul - RCA | - | 4 | 0 | 0 | 4 | - | - | 2 | 9 | 9 | - | - | 22 | - | - | - | - | 904 | 48 | - |
| 4a.1.5.53 | Standby Liquid Control - RCA | - | 26 | 1 | 2 | 41 | - | - | 13 | 83 | 83 | - | - | 245 | - | - | - | - | 9,969 | 341 | - |
| 4a.1.5.54 | Stator Cooling - RCA | - | 7 | 0 | 1 | 21 | - | - | 5 | 35 | 35 | - | - | 126 | - | - | - | - | 5,135 | 98 | - |
| 4a.1.5.55 | Traversing Incore Probe | - | 3 | 0 | 0 | 0 | 2 | - | 1 | 7 | 7 | - | - | 2 | 5 | - | - | - | 379 | 46 | - |
| 4a.1.5 | Totals | - | 7,490 | 347 | 1,370 | 23,501 | 1,032 | - | 5,894 | 39,634 | 39,610 | - | 24 | 140,459 | 3,050 | - | - | - | 5,899,167 | 104,297 | - |
| 4a.1.6 | Scaffolding in support of decommissioning | - | 2,106 | 22 | 12 | 191 | 31 | - | 567 | 2,929 | 2,929 | - | - | 1,030 | 91 | - | - | - | 52,111 | 19,968 | - |
| 4a.1 | Subtotal Period 4a Activity Costs | 211 | 27,165 | 15,691 | 4,132 | 33,494 | 35,367 | 557 | 40,431 | 157,048 | 157,024 | - | 24 | 184,963 | 30,945 | 1,628 | 600 | - | 10,226,560 | 209,462 | 2,110 |
| Period 4a Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 4a.3.1 | Process decommissioning water waste | 4 | - | 7 | 12 | - | 28 | - | 12 | 63 | 63 | - | - | - | 64 | - | - | - | 3,856 | 13 | - |
| 4a.3.3 | Small tool allowance | - | 267 | - | - | - | - | - | 40 | 307 | 276 | - | 31 | - | - | - | - | - | - | - | - |
| 4a.3.4 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 6,395 | 959 | 7,355 | - | 7,355 | - | - | - | - | - | - | - | - | - |
| 4a.3 | Subtotal Period 4a Collateral Costs | 4 | 267 | 7 | 12 | - | 28 | 6,395 | 1,011 | 7,724 | 339 | 7,355 | 31 | - | 64 | - | - | - | 3,856 | 13 | - |
| Period 4a Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 4a.4.1 | Decon supplies | 87 | - | - | - | - | - | - | 22 | 109 | 109 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.2 | Insurance | - | - | - | - | - | - | 790 | 79 | 869 | 869 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.3 | Property taxes | - | - | - | - | - | - | 3,594 | 359 | 3,953 | 3,293 | 660 | - | - | - | - | - | - | - | - | - |
| 4a.4.4 | Health physics supplies | - | 1,872 | - | - | - | - | - | 468 | 2,340 | 2,340 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.5 | Heavy equipment rental | - | 2,811 | - | - | - | - | - | 422 | 3,232 | 3,232 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.6 | Disposal of DAW generated | - | - | 89 | 46 | - | 370 | - | 108 | 612 | 612 | - | - | - | 4,485 | - | - | - | 89,703 | 146 | - |
| 4a.4.7 | Plant energy budget | - | - | - | - | - | - | 1,938 | 291 | 2,229 | 2,229 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.8 | NRC ISFSI Fees | - | - | - | - | - | - | 32 | 3 | 35 | - | 35 | - | - | - | - | - | - | - | - | - |
| 4a.4.9 | NRC Fees | - | - | - | - | - | - | 544 | 54 | 598 | 598 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.10 | Emergency Planning Fees | - | - | - | - | - | - | 167 | 17 | 183 | - | 183 | - | - | - | - | - | - | - | - | - |
| 4a.4.11 | Fixed Overhead | - | - | - | - | - | - | 2,380 | 357 | 2,737 | 2,737 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.12 | Liquid Radwaste Processing Equipment/Services | - | - | - | - | - | - | 477 | 72 | 549 | 549 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.13 | ISFSI Operating Costs | - | - | - | - | - | - | 126 | 19 | 145 | - | 145 | - | - | - | - | - | - | - | - | - |
| 4a.4.14 | Railroad Track Maintenance | - | - | - | - | - | - | 140 | 21 | 162 | 162 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.15 | Remedial Actions Surveys | - | - | - | - | - | - | 1,258 | 189 | 1,447 | 1,447 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.16 | Security Staff Cost | - | - | - | - | - | - | 6,666 | 1,000 | 7,666 | 5,734 | 1,932 | - | - | - | - | - | - | - | - | 101,051 |
| 4a.4.17 | DOC Staff Cost | - | - | - | - | - | - | 14,604 | 2,191 | 16,795 | 16,795 | - | - | - | - | - | - | - | - | - | 161,214 |
| 4a.4.18 | Utility Staff Cost | - | - | - | - | - | - | 19,141 | 2,871 | 22,012 | 20,691 | 1,321 | - | - | - | - | - | - | - | - | 294,391 |
| 4a.4 | Subtotal Period 4a Period-Dependent Costs | 87 | 4,683 | 89 | 46 | - | 370 | 51,858 | 8,542 | 65,674 | 61,399 | 4,275 | - | 4,485 | - | - | - | - | 89,703 | 146 | 556,657 |
| 4a.0 | TOTAL PERIOD 4a COST | 302 | 32,114 | 15,787 | 4,190 | 33,494 | 35,765 | 58,810 | 49,984 | 230,446 | 218,761 | 11,630 | 55 | 184,963 | 35,494 | 1,628 | 600 | - | 10,320,120 | 209,621 | 558,767 |
| PERIOD 4b - Site Decontamination | | | | | | | | | | | | | | | | | | | | | |
| Period 4b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| 4b.1.1 | Remove spent fuel racks | 591 | 58 | 103 | 149 | - | 2,572 | - | 986 | 4,459 | 4,459 | - | - | - | 7,653 | - | - | - | 486,170 | 906 | - |
| Disposal of Plant Systems | | | | | | | | | | | | | | | | | | | | | |
| 4b.1.2.1 | ALARA/Radiological | - | 16 | 0 | 0 | 8 | - | - | 5 | 30 | 30 | - | - | 49 | - | - | - | - | 1,987 | 247 | - |
| 4b.1.2.2 | Alternate N2 - RCA | - | 16 | 0 | 1 | 16 | - | - | 7 | 40 | 40 | - | - | 93 | - | - | - | - | 3,765 | 185 | - |
| 4b.1.2.3 | Cranes/Heavy Loads/Rigging - RCA | - | 3 | 0 | 1 | 17 | - | - | 4 | 25 | 25 | - | - | 103 | - | - | - | - | 4,184 | 48 | - |

**Monticello Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table J
Monticello Nuclear Generating Plant
SAFSTOR Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---------------------------------------|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| Disposal of Plant Systems (continued) | | | | | | | | | | | | | | | | | | | | | |
| 4b.1.2.4 | Decontamination Projects | - | 1 | 0 | 0 | 1 | - | - | 0 | 2 | 2 | - | - | 3 | - | - | - | - | 125 | 15 | - |
| 4b.1.2.5 | Electrical - Contaminated | - | 400 | 5 | 23 | 421 | - | - | 167 | 1,016 | 1,016 | - | - | 2,514 | - | - | - | - | 102,112 | 5,633 | - |
| 4b.1.2.6 | Electrical - Contaminated Fuel Pool | - | 42 | 1 | 2 | 42 | - | - | 17 | 105 | 105 | - | - | 253 | - | - | - | - | 10,272 | 592 | - |
| 4b.1.2.7 | Electrical - Decontam. Fuel Pool Area | - | 297 | 5 | 23 | 411 | - | - | 140 | 876 | 876 | - | - | 2,457 | - | - | - | - | 99,783 | 4,090 | - |
| 4b.1.2.8 | Electrical - Decontaminated | - | 2,698 | 48 | 218 | 3,906 | - | - | 1,298 | 8,167 | 8,167 | - | - | 23,344 | - | - | - | - | 948,013 | 37,107 | - |
| 4b.1.2.9 | Fire - RCA | - | 101 | 1 | 6 | 103 | - | - | 42 | 253 | 253 | - | - | 614 | - | - | - | - | 24,917 | 1,324 | - |
| 4b.1.2.10 | Fire - RCA - Fuel Pool Area | - | 11 | 0 | 1 | 10 | - | - | 4 | 26 | 26 | - | - | 62 | - | - | - | - | 2,499 | 143 | - |
| 4b.1.2.11 | Fuel Pool Cooling & Cleanup | - | 387 | 20 | 33 | 343 | 241 | - | 216 | 1,241 | 1,241 | - | - | 2,051 | 712 | - | - | - | 128,918 | 5,363 | - |
| 4b.1.2.12 | Fuel Pool Cooling & Cleanup - Insulated | - | 37 | 2 | 3 | 22 | 24 | - | 19 | 107 | 107 | - | - | 130 | 71 | - | - | - | 9,830 | 514 | - |
| 4b.1.2.13 | HVAC Ductwork | - | 276 | 6 | 26 | 469 | - | - | 144 | 921 | 921 | - | - | 2,805 | 921 | - | - | - | 113,913 | 3,539 | - |
| 4b.1.2.14 | HVAC Ductwork - Fuel Pool Area | - | 31 | 1 | 3 | 52 | - | - | 16 | 102 | 102 | - | - | 312 | - | - | - | - | 12,657 | 393 | - |
| 4b.1.2.15 | HVAC/Chilled Water - RCA | - | 324 | 6 | 26 | 461 | - | - | 155 | 971 | 971 | - | - | 2,752 | - | - | - | - | 111,779 | 3,985 | - |
| 4b.1.2.16 | HVAC/Chilled Water - RCA Fuel Pool Area | - | 33 | 0 | 2 | 37 | - | - | 14 | 87 | 87 | - | - | 223 | - | - | - | - | 9,072 | 397 | - |
| 4b.1.2.17 | Heating & Ventilation | - | 433 | 13 | 59 | 1,060 | - | - | 277 | 1,842 | 1,842 | - | - | 6,334 | - | - | - | - | 257,243 | 6,340 | - |
| 4b.1.2.18 | Heating Boiler - Insulated - RCA | - | 3 | 0 | 0 | 4 | - | - | 1 | 9 | 9 | - | - | 26 | - | - | - | - | 1,058 | 35 | - |
| 4b.1.2.19 | Instrument & Service Air-RCA-Fuel Pool | - | 29 | 1 | 2 | 45 | - | - | 14 | 91 | 91 | - | - | 267 | - | - | - | - | 10,841 | 357 | - |
| 4b.1.2.20 | Liquid Radwaste | - | 621 | 31 | 57 | 703 | 311 | - | 350 | 2,072 | 2,072 | - | - | 4,203 | 915 | - | - | - | 229,422 | 8,550 | - |
| 4b.1.2.21 | Makeup Demin - RCA | - | 103 | 3 | 14 | 246 | - | - | 65 | 431 | 431 | - | - | 1,471 | 431 | - | - | - | 59,747 | 1,412 | - |
| 4b.1.2.22 | Non-Essential Diesel Generator - RCA | - | 27 | 3 | 13 | 238 | - | - | 45 | 327 | 327 | - | - | 1,424 | - | - | - | - | 57,832 | 395 | - |
| 4b.1.2.23 | Off Gas Holdup | - | 310 | 7 | 34 | 607 | - | - | 174 | 1,133 | 1,133 | - | - | 3,629 | - | - | - | - | 147,355 | 4,256 | - |
| 4b.1.2.24 | Primary Containment | - | 411 | 16 | 77 | 1,389 | - | - | 324 | 2,218 | 2,218 | - | - | 8,302 | - | - | - | - | 337,148 | 5,729 | - |
| 4b.1.2.25 | Process Radiation Monitors | - | 41 | 0 | 2 | 36 | - | - | 16 | 95 | 95 | - | - | 213 | - | - | - | - | 8,667 | 577 | - |
| 4b.1.2.26 | Rx Bldg Closed Cng Water - Insul - RCA | - | 114 | 2 | 9 | 163 | - | - | 54 | 343 | 343 | - | - | 977 | - | - | - | - | 39,675 | 1,484 | - |
| 4b.1.2.27 | Rx Bldg Closed Cng Water - RCA | - | 184 | 15 | 66 | 1,187 | - | - | 235 | 1,687 | 1,687 | - | - | 7,093 | - | - | - | - | 288,031 | 2,489 | - |
| 4b.1.2.28 | Rx Component Handling Equip | - | 127 | 11 | 24 | 291 | 139 | - | 115 | 708 | 708 | - | - | 1,737 | 415 | - | - | - | 96,901 | 1,839 | - |
| 4b.1.2.29 | Rx Pressure Vessel | - | 43 | 5 | 5 | 27 | 57 | - | 30 | 167 | 167 | - | - | 161 | 169 | - | - | - | 17,375 | 578 | - |
| 4b.1.2.30 | Rx Water Cleanup | - | 239 | 16 | 15 | 47 | 214 | - | 124 | 655 | 655 | - | - | 278 | 630 | - | - | - | 51,819 | 3,264 | - |
| 4b.1.2.31 | Secondary Containment | - | 112 | 3 | 13 | 229 | - | - | 65 | 421 | 421 | - | - | 1,372 | - | - | - | - | 55,702 | 1,569 | - |
| 4b.1.2.32 | Service & Seal Water - Insulated - RCA | - | 120 | 2 | 11 | 197 | - | - | 62 | 392 | 392 | - | - | 1,180 | - | - | - | - | 47,917 | 1,565 | - |
| 4b.1.2.33 | Service & Seal Water - RCA | - | 159 | 4 | 17 | 303 | - | - | 88 | 570 | 570 | - | - | 1,809 | - | - | - | - | 73,453 | 2,016 | - |
| 4b.1.2.34 | Service Air Blower - RCA | - | 15 | 0 | 2 | 34 | - | - | 9 | 62 | 62 | - | - | 206 | - | - | - | - | 8,364 | 206 | - |
| 4b.1.2.35 | Solid Radwaste | - | 446 | 21 | 45 | 567 | 223 | - | 261 | 1,563 | 1,563 | - | - | 3,390 | 659 | - | - | - | 179,772 | 6,270 | - |
| 4b.1.2.36 | Structures & Buildings | - | 70 | 1 | 4 | 80 | - | - | 30 | 185 | 185 | - | - | 477 | - | - | - | - | 19,351 | 1,005 | - |
| 4b.1.2.37 | Wells & Domestic Water | - | 10 | - | - | - | - | - | 1 | 11 | - | - | 11 | - | - | - | - | - | - | 144 | - |
| 4b.1.2.38 | Wells & Domestic Water - RCA | - | 52 | 1 | 3 | 57 | - | - | 22 | 136 | 136 | - | - | 342 | - | - | - | - | 13,874 | 633 | - |
| 4b.1.2 | Totals | - | 8,342 | 249 | 841 | 13,829 | 1,210 | - | 4,613 | 29,085 | 29,073 | - | 11 | 82,654 | 3,571 | - | - | - | 3,585,374 | 114,290 | - |
| 4b.1.3 | Scaffolding in support of decommissioning | - | 3,159 | 33 | 19 | 286 | 46 | - | 850 | 4,394 | 4,394 | - | - | 1,545 | 136 | - | - | - | 78,166 | 29,953 | - |
| Decontamination of Site Buildings | | | | | | | | | | | | | | | | | | | | | |
| 4b.1.4.1 | Reactor Building | 4,668 | 2,596 | 178 | 516 | 8,044 | 1,181 | - | 4,580 | 21,764 | 21,764 | - | - | 48,077 | 7,014 | - | - | - | 2,317,670 | 100,718 | - |
| 4b.1.4.2 | Admin | 96 | 5 | 0 | 3 | - | 15 | - | 53 | 172 | 172 | - | - | - | 145 | - | - | - | 6,840 | 1,421 | - |
| 4b.1.4.3 | HPCI Room | 26 | 25 | 1 | 3 | 20 | 14 | - | 26 | 115 | 115 | - | - | 118 | 125 | - | - | - | 10,759 | 703 | - |
| 4b.1.4.4 | Hot Shop | 15 | 4 | 0 | 2 | - | 11 | - | 11 | 43 | 43 | - | - | - | 103 | - | - | - | 4,860 | 254 | - |
| 4b.1.4.5 | LLRW Storage & Shipping | 52 | 22 | 2 | 8 | 5 | 45 | - | 45 | 179 | 179 | - | - | 31 | 433 | - | - | - | 21,708 | 1,003 | - |
| 4b.1.4.6 | Offgas Stack | 336 | 241 | 7 | 23 | 225 | 82 | - | 286 | 1,199 | 1,199 | - | - | 1,343 | 669 | - | - | - | 87,045 | 7,924 | - |
| 4b.1.4.7 | Offgas Storage & Compressor | 36 | 15 | 1 | 6 | 4 | 33 | - | 32 | 128 | 128 | - | - | 25 | 316 | - | - | - | 15,948 | 696 | - |
| 4b.1.4.8 | Radwaste | 109 | 54 | 3 | 17 | 29 | 96 | - | 100 | 410 | 410 | - | - | 172 | 910 | - | - | - | 49,943 | 2,229 | - |
| 4b.1.4.9 | Radwaste Material Storage Warehouse | 57 | 21 | 2 | 9 | - | 52 | - | 48 | 189 | 189 | - | - | - | 495 | - | - | - | 23,400 | 1,062 | - |
| 4b.1.4.10 | Recombiner | 24 | 22 | 1 | 5 | 33 | 24 | - | 30 | 140 | 140 | - | - | 199 | 216 | - | - | - | 18,405 | 616 | - |
| 4b.1.4.11 | Turbine | 638 | 314 | 21 | 104 | 215 | 564 | - | 588 | 2,444 | 2,444 | - | - | 1,283 | 5,299 | - | - | - | 303,150 | 12,856 | - |
| 4b.1.4.12 | Turbine Building Addition | 53 | 19 | 1 | 8 | - | 45 | - | 44 | 169 | 169 | - | - | - | 434 | - | - | - | 20,478 | 968 | - |
| 4b.1.4.13 | Reactor (Post Fuel) | 849 | 2,325 | 172 | 913 | 329 | 5,301 | - | 2,535 | 12,425 | 12,425 | - | - | 1,969 | 50,605 | - | - | - | 2,471,778 | 40,860 | - |
| 4b.1.4 | Totals | 6,960 | 5,663 | 390 | 1,617 | 8,904 | 7,465 | - | 8,379 | 39,378 | 39,378 | - | - | 53,216 | 66,764 | - | - | - | 5,351,984 | 171,309 | - |
| 4b.1.5 | Prepare/submit License Termination Plan | - | - | - | - | - | - | 526 | 79 | 605 | 605 | - | - | - | - | - | - | - | - | - | 4,096 |
| 4b.1.6 | Receive NRC approval of termination plan | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - | - |
| 4b.1 | Subtotal Period 4b Activity Costs | 7,551 | 17,223 | 776 | 2,626 | 23,019 | 11,293 | 526 | 14,907 | 77,921 | 77,910 | - | 11 | 137,414 | 78,124 | - | - | - | 9,501,694 | 316,457 | 4,096 |
| Period 4b Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 4b.2.1 | License Termination Survey Planning | - | - | - | - | - | - | 1,458 | 437 | 1,896 | 1,896 | - | - | - | - | - | - | - | - | - | 12,480 |
| 4b.2.2 | Excavation of Underground Services | - | 1,972 | - | - | - | - | 376 | 550 | 2,898 | 2,898 | - | - | - | - | - | - | - | - | - | 12,493 |
| 4b.2.3 | Operational Equipment | - | - | 23 | 92 | 1,211 | - | - | 198 | 1,524 | 1,524 | - | - | 11,760 | - | - | - | - | 294,000 | 32 | - |
| 4b.2 | Subtotal Period 4b Additional Costs | - | 1,972 | 23 | 92 | 1,211 | - | 1,835 | 1,185 | 6,317 | 6,317 | - | - | 11,760 | - | - | - | - | 294,000 | 12,525 | 12,480 |

**Monticello Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table J
Monticello Nuclear Generating Plant
SAFSTOR Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|---|--------------|---------------|-----------------|-----------------|---------------------------|---------------------|----------------|-------------------|----------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| Period 4b Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 4b.3.1 | Process decommissioning water waste | 12 | - | 22 | 39 | - | 88 | - | 36 | 196 | 196 | - | - | - | 202 | - | - | - | 12,097 | 39 | - |
| 4b.3.3 | Small tool allowance | - | 397 | - | - | - | - | - | 60 | 456 | 456 | - | - | - | - | - | - | - | - | - | - |
| 4b.3.4 | Decommissioning Equipment Disposition | - | - | 130 | 82 | 1,112 | 178 | - | 237 | 1,739 | 1,739 | - | - | 6,000 | 529 | - | - | - | 303,608 | 147 | - |
| 4b.3.5 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 14,092 | 2,114 | 16,206 | - | 16,206 | - | - | - | - | - | - | - | - | - |
| 4b.3 | Subtotal Period 4b Collateral Costs | 12 | 397 | 152 | 121 | 1,112 | 266 | 14,092 | 2,446 | 18,597 | 2,392 | 16,206 | - | 6,000 | 731 | - | - | - | 315,705 | 186 | - |
| Period 4b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 4b.4.1 | Decon supplies | 1,701 | - | - | - | - | - | - | 425 | 2,126 | 2,126 | - | - | - | - | - | - | - | - | - | - |
| 4b.4.2 | Insurance | - | - | - | - | - | - | 1,434 | 143 | 1,577 | 1,577 | - | - | - | - | - | - | - | - | - | - |
| 4b.4.3 | Property taxes | - | - | - | - | - | - | 6,289 | 629 | 6,917 | 5,721 | 1,197 | - | - | - | - | - | - | - | - | - |
| 4b.4.4 | Health physics supplies | - | 3,050 | - | - | - | - | - | 763 | 3,813 | 3,813 | - | - | - | - | - | - | - | - | - | - |
| 4b.4.5 | Heavy equipment rental | - | 5,239 | - | - | - | - | - | 786 | 6,024 | 6,024 | - | - | - | - | - | - | - | - | - | - |
| 4b.4.6 | Disposal of DAW generated | - | - | 117 | 60 | - | 486 | - | 142 | 805 | 805 | - | - | - | 5,895 | - | - | - | 117,897 | 192 | - |
| 4b.4.7 | Plant energy budget | - | - | - | - | - | - | 2,777 | 417 | 3,194 | 3,194 | - | - | - | - | - | - | - | - | - | - |
| 4b.4.8 | NRC ISFSI Fees | - | - | - | - | - | - | 57 | 6 | 63 | - | 63 | - | - | - | - | - | - | - | - | - |
| 4b.4.9 | NRC Fees | - | - | - | - | - | - | 986 | 99 | 1,085 | 1,085 | - | - | - | - | - | - | - | - | - | - |
| 4b.4.10 | Emergency Planning Fees | - | - | - | - | - | - | 302 | 30 | 332 | - | 332 | - | - | - | - | - | - | - | - | - |
| 4b.4.11 | Fixed Overhead | - | - | - | - | - | - | 4,319 | 648 | 4,967 | 4,967 | - | - | - | - | - | - | - | - | - | - |
| 4b.4.12 | Liquid Radwaste Processing Equipment/Services | - | - | - | - | - | - | 866 | 130 | 996 | 996 | - | - | - | - | - | - | - | - | - | - |
| 4b.4.13 | ISFSI Operating Costs | - | - | - | - | - | - | 228 | 34 | 262 | - | 262 | - | - | - | - | - | - | - | - | - |
| 4b.4.14 | Railroad Track Maintenance | - | - | - | - | - | - | 255 | 38 | 293 | 293 | - | - | - | - | - | - | - | - | - | - |
| 4b.4.15 | Remedial Actions Surveys | - | - | - | - | - | - | 2,283 | 343 | 2,626 | 2,626 | - | - | - | - | - | - | - | - | - | - |
| 4b.4.16 | Security Staff Cost | - | - | - | - | - | - | 12,097 | 1,815 | 13,912 | 3,826 | 10,086 | - | - | - | - | - | - | - | - | 183,371 |
| 4b.4.17 | DOC Staff Cost | - | - | - | - | - | - | 25,916 | 3,887 | 29,803 | 29,803 | - | - | - | - | - | - | - | - | - | 284,065 |
| 4b.4.18 | Utility Staff Cost | - | - | - | - | - | - | 32,869 | 4,930 | 37,799 | 35,380 | 2,419 | - | - | - | - | - | - | - | - | 504,534 |
| 4b.4 | Subtotal Period 4b Period-Dependent Costs | 1,701 | 8,289 | 117 | 60 | - | 486 | 90,679 | 15,264 | 116,596 | 102,236 | 14,360 | - | - | 5,895 | - | - | - | 117,897 | 192 | 971,970 |
| 4b.0 | TOTAL PERIOD 4b COST | 9,264 | 27,881 | 1,067 | 2,898 | 25,343 | 12,044 | 107,132 | 33,802 | 219,432 | 188,855 | 30,565 | 11 | 155,174 | 84,750 | - | - | - | 10,229,300 | 329,361 | 988,546 |
| PERIOD 4f - License Termination | | | | | | | | | | | | | | | | | | | | | |
| Period 4f Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| 4f.1.1 | ORISE confirmatory survey | - | - | - | - | - | - | 166 | 50 | 216 | 216 | - | - | - | - | - | - | - | - | - | - |
| 4f.1.2 | Terminate license | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 4f.1 | Subtotal Period 4f Activity Costs | - | - | - | - | - | - | 166 | 50 | 216 | 216 | - | - | - | - | - | - | - | - | - | - |
| Period 4f Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 4f.2.1 | License Termination Survey | - | - | - | - | - | - | 6,920 | 2,076 | 8,995 | 8,995 | - | - | - | - | - | - | - | - | 95,048 | 6,240 |
| 4f.2 | Subtotal Period 4f Additional Costs | - | - | - | - | - | - | 6,920 | 2,076 | 8,995 | 8,995 | - | - | - | - | - | - | - | - | 95,048 | 6,240 |
| Period 4f Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 4f.3.1 | DOC staff relocation expenses | - | - | - | - | - | - | 1,264 | 190 | 1,454 | 1,454 | - | - | - | - | - | - | - | - | - | - |
| 4f.3.2 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 4,289 | 643 | 4,933 | - | 4,933 | - | - | - | - | - | - | - | - | - |
| 4f.3 | Subtotal Period 4f Collateral Costs | - | - | - | - | - | - | 5,553 | 833 | 6,386 | 1,454 | 4,933 | - | - | - | - | - | - | - | - | - |
| Period 4f Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 4f.4.1 | Insurance | - | - | - | - | - | - | 530 | 53 | 583 | - | 583 | - | - | - | - | - | - | - | - | - |
| 4f.4.2 | Property taxes | - | - | - | - | - | - | 2,198 | 220 | 2,417 | 1,975 | 442 | - | - | - | - | - | - | - | - | - |
| 4f.4.3 | Health physics supplies | - | 708 | - | - | - | - | - | 177 | 884 | 884 | - | - | - | - | - | - | - | - | - | - |
| 4f.4.4 | Disposal of DAW generated | - | - | 7 | 4 | - | 29 | - | 9 | 48 | 48 | - | - | 355 | - | - | - | - | 7,097 | 12 | - |
| 4f.4.5 | Plant energy budget | - | - | - | - | - | - | 274 | 41 | 315 | 315 | - | - | - | - | - | - | - | - | - | - |
| 4f.4.6 | NRC ISFSI Fees | - | - | - | - | - | - | 21 | 2 | 23 | - | 23 | - | - | - | - | - | - | - | - | - |
| 4f.4.7 | NRC Fees | - | - | - | - | - | - | 426 | 43 | 468 | 468 | - | - | - | - | - | - | - | - | - | - |
| 4f.4.8 | Emergency Planning Fees | - | - | - | - | - | - | 112 | 11 | 123 | - | 123 | - | - | - | - | - | - | - | - | - |
| 4f.4.9 | Fixed Overhead | - | - | - | - | - | - | 1,597 | 239 | 1,836 | 1,836 | - | - | - | - | - | - | - | - | - | - |
| 4f.4.10 | ISFSI Operating Costs | - | - | - | - | - | - | 84 | 13 | 97 | - | 97 | - | - | - | - | - | - | - | - | - |
| 4f.4.11 | Railroad Track Maintenance | - | - | - | - | - | - | 94 | 14 | 108 | 108 | - | - | - | - | - | - | - | - | - | - |
| 4f.4.12 | Security Staff Cost | - | - | - | - | - | - | 3,463 | 519 | 3,982 | 1,565 | 2,417 | - | - | - | - | - | - | - | - | 50,932 |
| 4f.4.13 | DOC Staff Cost | - | - | - | - | - | - | 5,393 | 809 | 6,201 | 6,201 | - | - | - | - | - | - | - | - | - | 57,200 |
| 4f.4.14 | Utility Staff Cost | - | - | - | - | - | - | 5,762 | 864 | 6,626 | 5,738 | 888 | - | - | - | - | - | - | - | - | 80,707 |
| 4f.4 | Subtotal Period 4f Period-Dependent Costs | - | 708 | 7 | 4 | - | 29 | 19,952 | 3,014 | 23,713 | 19,140 | 4,574 | - | - | 355 | - | - | - | 7,097 | 12 | 188,838 |
| 4f.0 | TOTAL PERIOD 4f COST | - | 708 | 7 | 4 | - | 29 | 32,591 | 5,973 | 39,311 | 29,805 | 9,507 | - | - | 355 | - | - | - | 7,097 | 95,059 | 195,078 |
| PERIOD 4 TOTALS | | 9,566 | 60,703 | 16,861 | 7,092 | 58,837 | 47,839 | 198,533 | 89,758 | 489,189 | 437,421 | 51,702 | 66 | 340,138 | 120,599 | 1,628 | 600 | - | 20,556,510 | 634,041 | 1,742,391 |

**Monticello Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table J
Monticello Nuclear Generating Plant
SAFSTOR Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|---------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| PERIOD 5b - Site Restoration | | | | | | | | | | | | | | | | | | | | | | |
| Period 5b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Demolition of Remaining Site Buildings | | | | | | | | | | | | | | | | | | | | | | |
| 5b.1.1.1 | Reactor Building | - | 1,971 | - | - | - | - | - | 296 | 2,267 | - | - | 2,267 | - | - | - | - | - | - | - | 13,911 | - |
| 5b.1.1.2 | Condensate Tanks Foundation | - | 10 | - | - | - | - | - | 1 | 11 | - | - | 11 | - | - | - | - | - | - | - | 50 | - |
| 5b.1.1.3 | Discharge Retention Basin | - | 4 | - | - | - | - | - | 1 | 5 | - | - | 5 | - | - | - | - | - | - | - | 25 | - |
| 5b.1.1.4 | HPCI Room | - | 19 | - | - | - | - | - | 3 | 22 | - | - | 22 | - | - | - | - | - | - | - | 97 | - |
| 5b.1.1.5 | Hot Shop | - | 16 | - | - | - | - | - | 2 | 19 | - | - | 19 | - | - | - | - | - | - | - | 177 | - |
| 5b.1.1.6 | Hydrogen & Oxygen Storage | - | 2 | - | - | - | - | - | 0 | 2 | - | - | 2 | - | - | - | - | - | - | - | 19 | - |
| 5b.1.1.7 | LLRW Storage & Shipping | - | 83 | - | - | - | - | - | 12 | 95 | - | - | 95 | - | - | - | - | - | - | - | 662 | - |
| 5b.1.1.8 | MSIV | - | 4 | - | - | - | - | - | 1 | 4 | - | - | 4 | - | - | - | - | - | - | - | 42 | - |
| 5b.1.1.9 | Misc Structures 2017 | - | 1,410 | - | - | - | - | - | 212 | 1,622 | - | - | 1,622 | - | - | - | - | - | - | - | 13,042 | - |
| 5b.1.1.10 | Offgas Stack | - | 108 | - | - | - | - | - | 16 | 124 | - | - | 124 | - | - | - | - | - | - | - | 544 | - |
| 5b.1.1.11 | Offgas Storage & Compressor | - | 39 | - | - | - | - | - | 6 | 45 | - | - | 45 | - | - | - | - | - | - | - | 199 | - |
| 5b.1.1.12 | Radwaste | - | 228 | - | - | - | - | - | 34 | 262 | - | - | 262 | - | - | - | - | - | - | - | 1,220 | - |
| 5b.1.1.13 | Recombiner | - | 128 | - | - | - | - | - | 19 | 147 | - | - | 147 | - | - | - | - | - | - | - | 713 | - |
| 5b.1.1.14 | Security Barrier | - | 186 | - | - | - | - | - | 28 | 214 | - | - | 214 | - | - | - | - | - | - | - | 933 | - |
| 5b.1.1.15 | Structures Greater than 3' Below Grade | - | 2,461 | - | - | - | - | - | 369 | 2,830 | - | - | 2,830 | - | - | - | - | - | - | - | 12,649 | - |
| 5b.1.1.16 | Tank Farm | - | 4 | - | - | - | - | - | 1 | 5 | - | - | 5 | - | - | - | - | - | - | - | 21 | - |
| 5b.1.1.17 | Turbine | - | 1,259 | - | - | - | - | - | 189 | 1,448 | - | - | 1,448 | - | - | - | - | - | - | - | 13,036 | - |
| 5b.1.1.18 | Turbine Building Addition | - | 55 | - | - | - | - | - | 8 | 63 | - | - | 63 | - | - | - | - | - | - | - | 618 | - |
| 5b.1.1.19 | Turbine Pedestal | - | 182 | - | - | - | - | - | 27 | 209 | - | - | 209 | - | - | - | - | - | - | - | 926 | - |
| 5b.1.1 | Totals | - | 8,169 | - | - | - | - | - | 1,225 | 9,394 | - | - | 9,394 | - | - | - | - | - | - | - | 58,885 | - |
| Site Closeout Activities | | | | | | | | | | | | | | | | | | | | | | |
| 5b.1.2 | Grade & landscape site | - | 896 | - | - | - | - | - | 134 | 1,031 | - | - | 1,031 | - | - | - | - | - | - | - | 1,841 | - |
| 5b.1.3 | Final report to NRC | - | - | - | - | - | - | 200 | 30 | 231 | 231 | - | - | - | - | - | - | - | - | - | - | 1,560 |
| 5b.1 | Subtotal Period 5b Activity Costs | - | 9,065 | - | - | - | - | 200 | 1,390 | 10,655 | 231 | - | 10,425 | - | - | - | - | - | - | - | 60,726 | 1,560 |
| Period 5b Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 5b.2.1 | Clean Concrete Disposal | - | 3,322 | - | - | - | - | 13 | 500 | 3,835 | - | - | 3,835 | - | - | - | - | - | - | - | 12 | - |
| 5b.2.2 | Intake Structure Cofferdam | - | 335 | - | - | - | - | - | 50 | 385 | - | - | 385 | - | - | - | - | - | - | - | 2,584 | - |
| 5b.2.3 | Construction Debris | - | - | - | - | - | - | 1,170 | 176 | 1,346 | - | - | 1,346 | - | - | - | - | - | - | - | - | - |
| 5b.2.4 | Backfill | - | 5,583 | - | - | - | - | - | 837 | 6,421 | - | - | 6,421 | - | - | - | - | - | - | - | 5,422 | - |
| 5b.2.5 | Discharge Structure Cofferdam | - | 442 | - | - | - | - | - | 66 | 508 | - | - | 508 | - | - | - | - | - | - | - | 3,552 | - |
| 5b.2.6 | Disposition of Original MPC Canisters | - | 55 | 185 | 954 | - | 5,641 | - | 1,709 | 8,544 | 8,544 | - | - | - | - | 21,097 | - | - | - | 2,505,700 | 337 | - |
| 5b.2 | Subtotal Period 5b Additional Costs | - | 9,737 | 185 | 954 | - | 5,641 | 1,183 | 3,339 | 21,039 | 8,544 | - | 12,495 | - | 21,097 | - | - | - | - | 2,505,700 | 11,907 | - |
| Period 5b Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 5b.3.1 | Small tool allowance | - | 111 | - | - | - | - | - | 17 | 127 | - | - | 127 | - | - | - | - | - | - | - | - | - |
| 5b.3.2 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 9,867 | 1,480 | 11,347 | - | 11,347 | - | - | - | - | - | - | - | - | - | - |
| 5b.3 | Subtotal Period 5b Collateral Costs | - | 111 | - | - | - | - | 9,867 | 1,497 | 11,475 | - | 11,347 | 127 | - | - | - | - | - | - | - | - | - |
| Period 5b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 5b.4.1 | Insurance | - | - | - | - | - | - | 1,220 | 122 | 1,342 | - | 1,342 | - | - | - | - | - | - | - | - | - | - |
| 5b.4.2 | Property taxes | - | - | - | - | - | - | 4,534 | 453 | 4,988 | - | - | 4,988 | - | - | - | - | - | - | - | - | - |
| 5b.4.3 | Heavy equipment rental | - | 5,842 | - | - | - | - | - | 876 | 6,719 | - | - | 6,719 | - | - | - | - | - | - | - | - | - |
| 5b.4.4 | Plant energy budget | - | - | - | - | - | - | 315 | 47 | 362 | - | 362 | - | - | - | - | - | - | - | - | - | - |
| 5b.4.5 | NRC ISFSI Fees | - | - | - | - | - | - | 375 | 37 | 412 | - | 412 | - | - | - | - | - | - | - | - | - | - |
| 5b.4.6 | Emergency Planning Fees | - | - | - | - | - | - | 257 | 26 | 283 | - | 283 | - | - | - | - | - | - | - | - | - | - |
| 5b.4.7 | Fixed Overhead | - | - | - | - | - | - | 1,122 | 168 | 1,290 | 0 | 860 | 429 | - | - | - | - | - | - | - | - | - |
| 5b.4.8 | ISFSI Operating Costs | - | - | - | - | - | - | 194 | 29 | 223 | - | 223 | - | - | - | - | - | - | - | - | - | - |
| 5b.4.9 | Railroad Track Maintenance | - | - | - | - | - | - | 217 | 33 | 249 | 0 | 150 | 100 | - | - | - | - | - | - | - | - | - |
| 5b.4.10 | Security Staff Cost | - | - | - | - | - | - | 7,971 | 1,196 | 9,167 | 0 | 8,580 | 587 | - | - | - | - | - | - | - | - | 117,235 |
| 5b.4.11 | DOC Staff Cost | - | - | - | - | - | - | 11,729 | 1,759 | 13,489 | - | - | 13,489 | - | - | - | - | - | - | - | - | 122,646 |
| 5b.4.12 | Utility Staff Cost | - | - | - | - | - | - | 7,148 | 1,072 | 8,220 | 82 | 2,047 | 6,091 | - | - | - | - | - | - | - | - | 101,904 |
| 5b.4 | Subtotal Period 5b Period-Dependent Costs | - | 5,842 | - | - | - | - | 35,082 | 5,819 | 46,744 | 82 | 14,259 | 32,402 | - | - | - | - | - | - | - | - | 341,785 |
| 5b.0 | TOTAL PERIOD 5b COST | - | 24,755 | 185 | 954 | - | 5,641 | 46,332 | 12,044 | 89,912 | 8,857 | 25,606 | 55,449 | - | 21,097 | - | - | - | - | 2,505,700 | 72,633 | 343,345 |
| PERIOD 5c - Fuel Storage Operations/Shipping | | | | | | | | | | | | | | | | | | | | | | |
| Period 5c Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Period 5c Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 5c.3.1 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 1,042,659 | 156,399 | 1,199,058 | - | 1,199,058 | - | - | - | - | - | - | - | - | - | - |

**Monticello Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table J
Monticello Nuclear Generating Plant
SAFSTOR Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| 5c.3 | Subtotal Period 5c Collateral Costs | - | - | - | - | - | - | 1,042,659 | 156,399 | 1,199,058 | - | 1,199,058 | - | - | - | - | - | - | - | - | - | - |
| Period 5c Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 5c.4.1 | Insurance | - | - | - | - | - | - | 97,505 | 9,751 | 107,256 | - | 107,256 | - | - | - | - | - | - | - | - | - | - |
| 5c.4.2 | Property taxes | - | - | - | - | - | - | 126,660 | 12,666 | 139,326 | - | 139,326 | - | - | - | - | - | - | - | - | - | - |
| 5c.4.3 | Plant energy budget | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 5c.4.4 | NRC ISFSI Fees | - | - | - | - | - | - | 29,939 | 2,994 | 32,933 | - | 32,933 | - | - | - | - | - | - | - | - | - | - |
| 5c.4.5 | Emergency Planning Fees | - | - | - | - | - | - | 20,554 | 2,055 | 22,610 | - | 22,610 | - | - | - | - | - | - | - | - | - | - |
| 5c.4.6 | Fixed Overhead | - | - | - | - | - | - | 29,861 | 4,479 | 34,340 | - | 34,340 | - | - | - | - | - | - | - | - | - | - |
| 5c.4.7 | ISFSI Operating Costs | - | - | - | - | - | - | 15,517 | 2,328 | 17,845 | - | 17,845 | - | - | - | - | - | - | - | - | - | - |
| 5c.4.8 | Railroad Track Maintenance | - | - | - | - | - | - | 17,335 | 2,600 | 19,935 | - | 19,935 | - | - | - | - | - | - | - | - | - | - |
| 5c.4.9 | Security Staff Cost | - | - | - | - | - | - | 542,257 | 81,339 | 623,596 | - | 623,596 | - | - | - | - | - | - | - | - | - | 7,785,623 |
| 5c.4.10 | DOC Staff Cost | - | - | - | - | - | - | 42,500 | 6,375 | 48,875 | - | 48,875 | - | - | - | - | - | - | - | - | - | 288,356 |
| 5c.4.11 | Utility Staff Cost | - | - | - | - | - | - | 264,872 | 39,731 | 304,603 | - | 304,603 | - | - | - | - | - | - | - | - | - | 3,820,722 |
| 5c.4 | Subtotal Period 5c Period-Dependent Costs | - | - | - | - | - | - | 1,187,001 | 164,317 | 1,351,318 | - | 1,351,318 | - | - | - | - | - | - | - | - | - | 11,894,700 |
| 5c.0 | TOTAL PERIOD 5c COST | - | - | - | - | - | - | 2,229,660 | 320,716 | 2,550,376 | - | 2,550,376 | - | - | - | - | - | - | - | - | - | 11,894,700 |
| PERIOD 5d - GTCC shipping | | | | | | | | | | | | | | | | | | | | | | |
| Period 5d Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Nuclear Steam Supply System Removal | | | | | | | | | | | | | | | | | | | | | | |
| 5d.1.1.1 | Vessel & Internals GTCC Disposal | - | - | 1,083 | - | - | 4,313 | - | 918 | 6,314 | 6,314 | - | - | - | - | - | - | 1,160 | 225,765 | - | - | - |
| 5d.1.1 | Totals | - | - | 1,083 | - | - | 4,313 | - | 918 | 6,314 | 6,314 | - | - | - | - | - | - | 1,160 | 225,765 | - | - | - |
| 5d.1 | Subtotal Period 5d Activity Costs | - | - | 1,083 | - | - | 4,313 | - | 918 | 6,314 | 6,314 | - | - | - | - | - | - | 1,160 | 225,765 | - | - | - |
| Period 5d Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 5d.3.1 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 28 | 4 | 32 | - | 32 | - | - | - | - | - | - | - | - | - | - |
| 5d.3 | Subtotal Period 5d Collateral Costs | - | - | - | - | - | - | 28 | 4 | 32 | - | 32 | - | - | - | - | - | - | - | - | - | - |
| Period 5d Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 5d.4.1 | Insurance | - | - | - | - | - | - | 27 | 3 | 30 | 30 | - | - | - | - | - | - | - | - | - | - | - |
| 5d.4.2 | Property taxes | - | - | - | - | - | - | 35 | 3 | 38 | 38 | - | - | - | - | - | - | - | - | - | - | - |
| 5d.4.4 | NRC ISFSI Fees | - | - | - | - | - | - | 8 | 1 | 9 | - | 9 | - | - | - | - | - | - | - | - | - | - |
| 5d.4.5 | Emergency Planning Fees | - | - | - | - | - | - | 6 | 1 | 6 | - | 6 | - | - | - | - | - | - | - | - | - | - |
| 5d.4.6 | Fixed Overhead | - | - | - | - | - | - | 8 | 1 | 10 | 10 | - | - | - | - | - | - | - | - | - | - | - |
| 5d.4.7 | Railroad Track Maintenance | - | - | - | - | - | - | 5 | 1 | 6 | 6 | - | - | - | - | - | - | - | - | - | - | - |
| 5d.4.8 | Security Staff Cost | - | - | - | - | - | - | 150 | 23 | 173 | 173 | - | - | - | - | - | - | - | - | - | - | 2,154 |
| 5d.4.9 | Utility Staff Cost | - | - | - | - | - | - | 39 | 6 | 45 | 45 | - | - | - | - | - | - | - | - | - | - | 539 |
| 5d.4 | Subtotal Period 5d Period-Dependent Costs | - | - | - | - | - | - | 278 | 38 | 316 | 301 | 15 | - | - | - | - | - | - | - | - | - | 2,693 |
| 5d.0 | TOTAL PERIOD 5d COST | - | - | 1,083 | - | - | 4,313 | 306 | 960 | 6,661 | 6,615 | 47 | - | - | - | - | - | 1,160 | 225,765 | - | - | 2,693 |
| PERIOD 5e - ISFSI Decontamination | | | | | | | | | | | | | | | | | | | | | | |
| Period 5e Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Period 5e Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 5e.2.1 | License Termination ISFSI | - | 0 | 3 | 33 | - | 283 | 2,086 | 602 | 3,008 | 3,008 | - | - | - | 848 | - | - | - | 131,507 | 10,502 | 2,225 | - |
| 5e.2 | Subtotal Period 5e Additional Costs | - | 0 | 3 | 33 | - | 283 | 2,086 | 602 | 3,008 | 3,008 | - | - | - | 848 | - | - | - | 131,507 | 10,502 | 2,225 | - |
| Period 5e Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 5e.4.1 | Insurance | - | - | - | - | - | - | 118 | 30 | 148 | 148 | - | - | - | - | - | - | - | - | - | - | - |
| 5e.4.2 | Property taxes | - | - | - | - | - | - | 248 | 62 | 310 | 310 | - | - | - | - | - | - | - | - | - | - | - |
| 5e.4.3 | Plant energy budget | - | - | - | - | - | - | 12 | 3 | 15 | 15 | - | - | - | - | - | - | - | - | - | - | - |
| 5e.4.4 | Fixed Overhead | - | - | - | - | - | - | 71 | 18 | 89 | 89 | - | - | - | - | - | - | - | - | - | - | - |
| 5e.4.5 | Railroad Track Maintenance | - | - | - | - | - | - | 41 | 10 | 52 | 52 | - | - | - | - | - | - | - | - | - | - | - |
| 5e.4.6 | Security Staff Cost | - | - | - | - | - | - | 352 | 88 | 440 | 440 | - | - | - | - | - | - | - | - | - | - | 4,999 |
| 5e.4.7 | Utility Staff Cost | - | - | - | - | - | - | 261 | 65 | 326 | 326 | - | - | - | - | - | - | - | - | - | - | 3,792 |
| 5e.4 | Subtotal Period 5e Period-Dependent Costs | - | - | - | - | - | - | 1,104 | 276 | 1,380 | 1,380 | - | - | - | - | - | - | - | - | - | - | 8,792 |
| 5e.0 | TOTAL PERIOD 5e COST | - | 0 | 3 | 33 | - | 283 | 3,190 | 877 | 4,387 | 4,387 | - | - | - | 848 | - | - | - | 131,507 | 10,502 | 11,017 | - |

**Monticello Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table J
Monticello Nuclear Generating Plant
SAFSTOR Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|-------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| PERIOD 5f - ISFSI Site Restoration | | | | | | | | | | | | | | | | | | | | | | |
| Period 5f Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Period 5f Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 5f.2.1 | Demolition and Site Restoration of ISFSI | - | 1,564 | - | - | - | - | 256 | 273 | 2,093 | - | - | 2,093 | - | - | - | - | - | - | - | 7,309 | 160 |
| 5f.2 | Subtotal Period 5f Additional Costs | - | 1,564 | - | - | - | - | 256 | 273 | 2,093 | - | - | 2,093 | - | - | - | - | - | - | - | 7,309 | 160 |
| Period 5f Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 5f.3.1 | Small tool allowance | - | 11 | - | - | - | - | - | 2 | 12 | - | - | 12 | - | - | - | - | - | - | - | - | - |
| 5f.3 | Subtotal Period 5f Collateral Costs | - | 11 | - | - | - | - | - | 2 | 12 | - | - | 12 | - | - | - | - | - | - | - | - | - |
| Period 5f Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 5f.4.2 | Property taxes | - | - | - | - | - | - | 127 | 13 | 140 | - | - | 140 | - | - | - | - | - | - | - | - | - |
| 5f.4.3 | Heavy equipment rental | - | 118 | - | - | - | - | - | 18 | 136 | - | - | 136 | - | - | - | - | - | - | - | - | - |
| 5f.4.4 | Plant energy budget | - | - | - | - | - | - | 6 | 1 | 7 | - | - | 7 | - | - | - | - | - | - | - | - | - |
| 5f.4.5 | Fixed Overhead | - | - | - | - | - | - | 37 | 5 | 42 | - | - | 42 | - | - | - | - | - | - | - | - | - |
| 5f.4.6 | Railroad Track Maintenance | - | - | - | - | - | - | 21 | 3 | 24 | - | - | 24 | - | - | - | - | - | - | - | - | - |
| 5f.4.7 | Security Staff Cost | - | - | - | - | - | - | 180 | 27 | 207 | - | - | 207 | - | - | - | - | - | - | - | - | 2,562 |
| 5f.4.8 | Utility Staff Cost | - | - | - | - | - | - | 111 | 17 | 128 | - | - | 128 | - | - | - | - | - | - | - | - | 1,590 |
| 5f.4 | Subtotal Period 5f Period-Dependent Costs | - | 118 | - | - | - | - | 482 | 84 | 685 | - | - | 685 | - | - | - | - | - | - | - | - | 4,151 |
| 5f.0 | TOTAL PERIOD 5f COST | - | 1,693 | - | - | - | - | 738 | 358 | 2,790 | - | - | 2,790 | - | - | - | - | - | - | - | 7,309 | 4,311 |
| PERIOD 5 TOTALS | | - | 26,448 | 1,271 | 987 | - | 10,238 | 2,280,226 | 334,956 | 2,654,126 | 19,859 | 2,576,029 | 58,239 | - | 21,944 | - | - | 1,160 | 2,862,972 | 90,444 | 12,256,070 | |
| TOTAL COST TO DECOMMISSION | | 21,016 | 100,409 | 18,576 | 8,641 | 58,852 | 59,781 | 3,982,657 | 646,370 | 4,896,303 | 1,248,734 | 3,588,215 | 59,354 | 340,180 | 153,182 | 1,628 | 600 | 1,160 | 23,731,310 | 873,407 | 21,956,280 | |

| | | |
|--|--------------------|----------------------------------|
| TOTAL COST TO DECOMMISSION WITH 15.21% CONTINGENCY: | \$4,896,303 | thousands of 2020 dollars |
| TOTAL NRC LICENSE TERMINATION COST IS 25.5% OR: | \$1,248,734 | thousands of 2020 dollars |
| SPENT FUEL MANAGEMENT COST IS 73.28% OR: | \$3,588,215 | thousands of 2020 dollars |
| NON-NUCLEAR DEMOLITION COST IS 1.21% OR: | \$59,354 | thousands of 2020 dollars |
| TOTAL LOW-LEVEL RADIOACTIVE WASTE VOLUME BURIED (EXCLUDING GTCC): | 155,409 | Cubic Feet |
| TOTAL GREATER THAN CLASS C RADWASTE VOLUME GENERATED: | 1,160 | Cubic Feet |
| TOTAL SCRAP METAL REMOVED: | 23,123 | Tons |
| TOTAL CRAFT LABOR REQUIREMENTS: | 873,407 | Man-hours |

End Notes:
n/a - indicates that this activity not charged as decommissioning expense
a - indicates that this activity performed by decommissioning staff
0 - indicates that this value is less than 0.5 but is non-zero
A cell containing " - " indicates a zero value

**Monticello Nuclear Generating Plant
Decommissioning Cost Analysis**

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**APPENDIX K
ISFSI DECOMMISSIONING**

| | <u>Page</u> |
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| Monticello Nuclear Generating Plant – Scenarios 3, 4, 7 and 8 | K-3 |

**Monticello Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table K-1
Monticello Nuclear Generating Plant
ISFSI Decommissioning Cost Estimate
Scenarios 1, 2, 5, and 6
(thousands of 2020 dollars)**

| Activity Description | Removal Costs | Packaging Costs | Transport Costs | LLRW Disposal Costs | Other Costs | Total Costs | Burial Volume Class A (cubic feet) | Craft Manhours | Oversight and Contractor Manhours |
|---|----------------------|------------------------|------------------------|----------------------------|--------------------|--------------------|---|-----------------------|--|
| Decommissioning Contractor | | | | | | | | | |
| Planning (characterization, specs and procedures) | - | - | - | - | 217 | 217 | - | - | 1,048 |
| Decontamination (activated disposition) | 57 | 188 | 987 | 5,925 | - | 7,157 | 21,949 | 366 | - |
| License Termination (radiological surveys) | - | - | - | - | 1,327 | 1,327 | - | 9,973 | - |
| Subtotal | 57 | 188 | 987 | 5,925 | 1,544 | 8,701 | 21,949 | 10,339 | 1,048 |
| Supporting Costs | | | | | | | | | |
| NRC and NRC Contractor Fees and Costs | - | - | - | - | 469 | 469 | - | - | 1,153 |
| Insurance | - | - | - | - | 118 | 118 | - | - | - |
| Property taxes | - | - | - | - | 249 | 249 | - | - | - |
| Plant energy budget | - | - | - | - | 12 | 12 | - | - | - |
| Fixed Overhead | - | - | - | - | 71 | 71 | - | - | - |
| Railroad Track Maintenance | - | - | - | - | 41 | 41 | - | - | - |
| Security Staff Cost | - | - | - | - | 352 | 352 | - | - | 3,792 |
| Utility Staff Cost | - | - | - | - | 261 | 261 | - | - | 8,792 |
| Subtotal | - | - | - | - | 1,574 | 1,574 | - | - | 13,737 |
| Total (w/o contingency) | 57 | 188 | 987 | 5,925 | 3,118 | 10,275 | 21,949 | 10,339 | 14,785 |
| Total (w/25% contingency) | 71 | 235 | 1,234 | 7,406 | 3,897 | 12,844 | | | |

The application of contingency (25%) is consistent with the evaluation criteria referenced by the NRC in NUREG-1757 ("Consolidated Decommissioning Guidance, Financial Assurance, Recordkeeping, and Timeliness," U.S. NRC's Office of Nuclear Material Safety and Safeguards, NUREG-1757, Vol. 3, Rev. 1, February 2012)

**Monticello Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table K-2
Monticello Nuclear Generating Plant
ISFSI Decommissioning Cost Estimate
Scenarios 3, 4, 7, and 8
(thousands of 2020 dollars)**

| Activity Description | Removal Costs | Packaging Costs | Transport Costs | LLRW Disposal Costs | Other Costs | Total Costs | Burial Volume Class A (cubic feet) | Craft Manhours | Oversight and Contractor Manhours |
|---|----------------------|------------------------|------------------------|----------------------------|--------------------|--------------------|---|-----------------------|--|
| Decommissioning Contractor | | | | | | | | | |
| Planning (characterization, specs and procedures) | - | - | - | - | 228 | 228 | - | - | 1,072 |
| Decontamination (activated disposition) | 0 | 3 | 33 | 283 | - | 320 | 848 | 29 | - |
| License Termination (radiological surveys) | - | - | - | - | 1,388 | 1,388 | - | 10,473 | - |
| Subtotal | 0 | 3 | 33 | 283 | 1,616 | 1,936 | 848 | 10,502 | 1,072 |
| Supporting Costs | | | | | | | | | |
| NRC and NRC Contractor Fees and Costs | - | - | - | - | 470 | 470 | - | - | 1,153 |
| Insurance | - | - | - | - | 118 | 118 | - | - | - |
| Property taxes | - | - | - | - | 249 | 249 | - | - | - |
| Plant energy budget | - | - | - | - | 12 | 12 | - | - | - |
| Fixed Overhead | - | - | - | - | 71 | 71 | - | - | - |
| Railroad Track Maintenance | - | - | - | - | 41 | 41 | - | - | - |
| Security Staff Cost | - | - | - | - | 352 | 352 | - | - | 4,999 |
| Utility Staff Cost | - | - | - | - | 261 | 261 | - | - | 3,792 |
| Subtotal | - | - | - | - | 1,575 | 1,575 | - | - | 9,945 |
| Total (w/o contingency) | 0 | 3 | 33 | 283 | 3,191 | 3,511 | 848 | 10,502 | 11,017 |
| Total (w/25% contingency) | 0 | 4 | 41 | 354 | 3,989 | 4,389 | | | |

The application of contingency (25%) is consistent with the evaluation criteria referenced by the NRC in NUREG-1757 ("Consolidated Decommissioning Guidance, Financial Assurance, Recordkeeping, and Timeliness," U.S. NRC's Office of Nuclear Material Safety and Safeguards, NUREG-1757, Vol. 3, Rev. 1, February 2012)

ENCLOSURE 4

**2020 DECOMMISSIONING COST ANALYSIS FOR THE PRAIRIE ISLAND NUCLEAR
GENERATING PLANT**

377 pages follow

Document X01-1775-001, Rev. 0

DECOMMISSIONING COST ANALYSIS
for the
PRAIRIE ISLAND NUCLEAR GENERATING PLANT



prepared for

Xcel Energy

prepared by

TLG Services, LLC
Bridgewater, Connecticut

October 2020

***Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis***

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APPROVALS

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**Prairie Island Nuclear Generating Plant
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EXECUTIVE SUMMARY

This report presents estimates of the cost to decommission the Prairie Island Nuclear Generating Plant (Prairie Island) for the identified decommissioning scenarios following a cessation of plant operations and the operation and eventual decommissioning of the on-site Independent Spent Fuel Storage Installation (ISFSI). The estimates are designed to provide Xcel Energy with the information to assess its current decommissioning liability, as it relates to Prairie Island.

The analysis relies upon site-specific, technical information from an evaluation prepared in 2017, ^[1] updated to reflect current assumptions pertaining to the disposition of the nuclear plant and relevant industry experience in undertaking such projects. The costs are based on several key assumptions in areas of regulation, component characterization, high-level radioactive waste management, low-level radioactive waste disposal, performance uncertainties (contingency) and site restoration requirements.

While the analysis is not a detailed engineering evaluation, it represents the estimates prepared in advance of the detailed engineering required to carry out the decommissioning of the nuclear units. It may also not reflect the actual plan to decommission Prairie Island; the plan may differ from the assumptions made in this analysis based on facts that exist at the time of decommissioning.

The primary goal of the decommissioning is the removal and disposal of the contaminated systems and structures so that the plant's operating licenses can be terminated. The analysis recognizes that spent fuel will be stored at the site in the plant's storage pool and/or in an Independent Spent Fuel Storage Installation (ISFSI) until such time that it can be transferred to a Department of Energy (DOE) facility. Consequently, the estimates also include those costs to manage and subsequently decommission these storage facilities.

The current cost estimates assume that Prairie Island Unit 1 ceases operations in 2033, and 2034 for Unit 2. The cost estimates assume that the shutdown dates of the nuclear units are scheduled and pre-planned (i.e., there is no delay in transitioning the plant and workforce from operations or in obtaining regulatory relief from operating requirements, etc.). This estimate includes additional resources to support the engineering, planning, and licensing efforts for the station; this is done to support a decommissioning schedule similar to the prior estimate. The estimates include the continued operation of the auxiliary building as an interim wet fuel storage facility for

¹ "Decommissioning Cost Analysis for the Prairie Island Nuclear Generating Plant," Document No. X01-1725-001, Rev. 0, TLG Services, Inc., October 2017

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approximately four years after operations cease. The spent fuel will remain in the ISFSI until the DOE is able to complete the transfer of the fuel to a federal facility (e.g., a monitored retrievable storage facility).^[2] The estimates also include the dismantling of non-essential structures and limited restoration of the site.

The 2017 plant inventory, the basis for the decontamination and dismantling requirements and cost, and the decommissioning waste streams, was reviewed for this analysis. Over the three-year period between estimates the plant confirmed there were no substantive changes to the configuration of the plant or site facilities (that would significantly impact decommissioning).

The costs to decommission Prairie Island, for the scenarios evaluated, are tabulated at the end of this section. Costs are reported in 2020 dollars and include monies anticipated to be spent for radiological remediation and operating license termination, spent fuel management, and site restoration activities.

A complete discussion of the assumptions relied upon in this analysis is provided in Section 3, along with schedules of annual expenditures for each scenario. A sequence of significant project activities is provided in Section 4 along with a timeline for each scenario. Detailed cost reports used to generate the summary tables contained within this document are provided in Appendices C through J.

Alternatives and Regulations

The ultimate objective of the decommissioning process is to reduce the inventory of contaminated and activated material so that the licenses can be terminated. The Nuclear Regulatory Commission (NRC or Commission) provided initial decommissioning requirements in its rule adopted on June 27, 1988.^[3] In this rule, the NRC set forth technical and financial criteria for decommissioning licensed nuclear power facilities. The regulations addressed planning needs, timing, funding methods, and environmental review requirements for decommissioning. The rule also defined three decommissioning alternatives as being acceptable to the NRC: DECON, SAFSTOR, and ENTOMB.

DECON is defined as "the alternative in which the equipment, structures, and portions of a facility and site containing radioactive contaminants are

² Projected expenditures for spent fuel management identified in the cost analysis do not consider any compensation for damages with regard to the delays incurred by Xcel Energy in the timely removal of spent fuel by the DOE.

³ U.S. Code of Federal Regulations, Title 10, Parts 30, 40, 50, 51, 70 and 72, "General Requirements for Decommissioning Nuclear Facilities," Nuclear Regulatory Commission, 53 Fed. Reg. 24018, June 27, 1988

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removed or decontaminated to a level that permits the property to be released for unrestricted use shortly after cessation of operations."^[4]

SAFSTOR is defined as "the alternative in which the nuclear facility is placed and maintained in a condition that allows the nuclear facility to be safely stored and subsequently decontaminated (deferred decontamination) to levels that permit release for unrestricted use."^[5] Decommissioning is to be completed within 60 years, although longer time periods will be considered when necessary to protect public health and safety.

ENTOMB is defined as "the alternative in which radioactive contaminants are encased in a structurally long-lived material, such as concrete; the entombed structure is appropriately maintained and continued surveillance is carried out until the radioactivity decays to a level permitting unrestricted release of the property."^[6] As with the SAFSTOR alternative, decommissioning is currently required to be completed within 60 years, although longer time periods will also be considered when necessary to protect public health and safety.

The 60-year restriction has limited the practicality for the ENTOMB alternative at commercial reactors that generate significant amounts of long-lived radioactive material. In 1997, the Commission directed its staff to re-evaluate this alternative and identify the technical requirements and regulatory actions that would be necessary for entombment to become a viable option. The resulting evaluation provided several recommendations, however, rulemaking has been deferred based upon several factors (e.g., no licensee has committed to pursuing the entombment option, the unresolved issues associated with the disposition of greater-than-Class C material (GTCC), and the NRC's current priorities) at least until after the additional research studies are complete. The Commission concurred with the staff's recommendation. In a draft regulatory basis document published in March 2017 in support of rulemaking that would amend NRC regulations concerning nuclear plant decommissioning, the NRC staff proposes removing any discussion of the ENTOMB option from existing guidance documents since the method is not deemed practically feasible.

In 1996, the NRC published revisions to its general requirements for decommissioning nuclear power plants to clarify ambiguities and codify procedures and terminology as a

⁴ Ibid. Page FR24022, Column 3

⁵ Ibid.

⁶ Ibid. Page FR24023, Column 2

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means of enhancing efficiency and uniformity in the decommissioning process.^[7] The amendments allow for greater public participation and better define the transition process from operations to decommissioning. Regulatory Guide 1.184 Revision 1, issued in October 2013, further described the methods and procedures that are acceptable to the NRC staff for implementing the requirements of the 1996 revised rule that relate to the initial activities and the major phases of the decommissioning process. The costs and schedules presented in this analysis follow the general guidance and sequence in the amended regulations. The format and content of the estimates is also consistent with the recommendations of Regulatory Guide 1.202, issued February 2005.^[8]

In 2011, the NRC published amended regulations to improve decommissioning planning and thereby reduce the likelihood that any current operating facility will become a legacy site.^[9] The regulations require licensees to report additional details in their decommissioning cost estimate, including a decommissioning estimate for the ISFSI. This estimate is provided in Appendix K.

Decommissioning Scenarios

The following scenarios were evaluated and are intended to bound the liability associated with the removal of spent fuel from the site. The current operating licenses expire in 2033 and 2034 for Units 1 and 2, respectively. The scenarios consist of four spent fuel management scenarios, each with a DECON and a SAFSTOR decommissioning alternative for eight total scenarios. The duration of the spent fuel scenarios has little impact to the decommissioning costs and timing of the power block systems and structures. The spent fuel in the plant's spent fuel storage pool is transferred to the ISFSI within the first four years. The equipment, structures, and portions of the plant containing radioactive contaminants are removed or decontaminated to a level that permits the facility to be released for unrestricted use. Remaining site structures are then demolished. Spent fuel storage operations continue at the ISFSI until the transfer of the fuel to the DOE is completed (as shown in the "Last Spent Fuel Assembly" column in the following table).

⁷ U.S. Code of Federal Regulations, Title 10, Parts 2, 50 and 51, "Decommissioning of Nuclear Power Reactors," Nuclear Regulatory Commission, 61 Fed. Reg. 39278, July 29, 1996

⁸ "Standard Format and Content of Decommissioning Cost Estimates for Nuclear Power Reactors," Regulatory Guide 1.202, Nuclear Regulatory Commission, February 2005

⁹ U.S. Code of Federal Regulations, Title 10, Parts 20, 30, 40, 50, 70, and 72, "Decommissioning Planning," Nuclear Regulatory Commission, Federal Register Volume 76, (p 35512 et seq.), June 17, 2011

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| Scenario | 1 st Spent Fuel Canister Replacement | 1 st Spent Fuel Assembly Removed from Prairie Island | Last Spent Fuel Assembly Removed from Prairie Island | Scenario Identification |
|----------|---|---|--|-------------------------------------|
| 1 | n/a | 2037 | 2074 | DECON with 42 Year DFS ⁺ |
| 2 | n/a | 2053 | 2077 | DECON with 60 Year DFS |
| 3 | 2045 | 2093 | 2117 | DECON with 100 Year DFS |
| 4 | 2045 | 2193 | 2217 | DECON with 200 Year DFS |
| 5 | n/a | 2037 | 2074 | SAFSTOR with 42 Year DFS |
| 6 | n/a | 2053 | 2077 | SAFSTOR with 60 Year DFS |
| 7 | 2045 | 2093 | 2117 | SAFSTOR with 100 Year DFS |
| 8 | 2045 | 2193 | 2217 | SAFSTOR with 200 Year DFS |

⁺ Dry Fuel Storage

For Scenarios 1 and 5, although they only provide a total fuel storage period of 42 years following Unit 2 shutdown, some of the Prairie Island casks have been in storage since 1995. Xcel Energy directed TLG Services to not include the cost of transferring the spent fuel in dry storage to new canisters for those casks that exceed 50 years. The assumption to not transfer spent fuel at 50-years total storage duration for these two scenarios was premised on the likelihood that the life of the canisters could be successfully extended for the additional years.

For Scenarios 2 and 6, although they provide a total fuel storage period of nominally 60 years following shutdown, Xcel Energy directed TLG Services to not include the cost of transferring the spent fuel in dry storage to new canisters at the 50-year mark.

In Scenarios 3, 4, 7 and 8, the Dry Shielded Canisters (DSCs) are assumed to be replaced after fifty years of use. Since the auxiliary building spent fuel storage pool and fuel handling facilities are removed by the year 2037, a dry fuel transfer facility is assumed to be constructed on site to perform the transfers from the old to the new DSCs. For Scenarios 3 and 7, two such transfers are needed over the time frame assumed. For Scenarios 4 and 8, the spent fuel will be transferred four times following initial placement in the ISFSI.

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Methodology

The methodology used to develop the estimates follows the basic approach originally presented in the cost estimating guidelines ^[10] developed by the Atomic Industrial Forum (now Nuclear Energy Institute). This reference describes a unit cost factor method for estimating decommissioning activity costs. The unit cost factors used in this analysis incorporate site-specific costs and the latest available information about worker productivity in decommissioning.

An activity duration critical path is used to determine the total decommissioning program schedule. This is required for calculating the carrying costs, which include program management, administration, field engineering, equipment rental, quality assurance, and security. This systematic approach for assembling decommissioning estimates ensures a high degree of confidence in the reliability of the resulting costs.

The estimates also reflect lessons learned from TLG's involvement in the Shippingport Station Decommissioning Project, completed in 1989, as well as the decommissioning of the Cintichem reactor, hot cells and associated facilities, completed in 1997. In addition, the planning and engineering for the Rancho Seco, Trojan, Yankee Rowe, Big Rock Point, Maine Yankee, Humboldt Bay-3, Oyster Creek, Connecticut Yankee, Crystal River, Vermont Yankee, Fort Calhoun, Pilgrim, and Indian Point nuclear units have provided additional insight into the process, the regulatory aspects, and the technical challenges of decommissioning commercial nuclear units.

Contingency

Consistent with cost estimating practice, contingencies are applied to the decontamination and dismantling costs developed as "specific provision for unforeseeable elements of cost within the defined project scope, particularly important where previous experience relating estimates and actual costs has shown that unforeseeable events which will increase costs are likely to occur."^[11] The cost elements in the estimates are based on ideal conditions; therefore, the types of unforeseeable events that are almost certain to occur in decommissioning, based on industry experience, are addressed through a percentage contingency applied on a line-item basis. This contingency factor is a nearly universal element in all large-scale construction and demolition projects. It should be noted that contingency, as used in this analysis, does not account for price escalation and inflation in the cost of

¹⁰ T.S. LaGuardia et al., "Guidelines for Producing Commercial Nuclear Power Plant Decommissioning Cost Estimates," AIF/NESP-036, May 1986

¹¹ Project and Cost Engineers' Handbook, Second Edition, American Association of Cost Engineers, Marcel Dekker, Inc., New York, New York, p. 239

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decommissioning over the remaining operating life of the station, or duration of the decommissioning program and dry fuel storage period.

Contingency funds are expected to be fully expended throughout the program. As such, inclusion of contingency is necessary to provide assurance that sufficient funding will be available to accomplish the intended tasks.

Low-Level Radioactive Waste Disposal

The contaminated and neutron-activated material generated in the decontamination and dismantling of a commercial nuclear reactor is classified as low-level (radioactive) waste, although not all of the material is suitable for “shallow-land” disposal. With the passage of the “Low-Level Radioactive Waste Policy Act” in 1980, ^[12] and its Amendments of 1985, ^[13] the states became ultimately responsible for the disposition of low-level radioactive waste generated within their own borders. It was expected that groups of states would combine together to jointly deal with their radioactive wastes; these organizations are referred to as waste disposal compacts.

With the exception of Texas, no new compact facilities have been successfully sited, licensed, and constructed. The Texas Compact disposal facility is now operational and waste is being accepted from generators within the Compact by the operator, Waste Control Specialists (WCS). The facility is also able to accept limited quantities of non-Compact waste.

Disposition of the various waste streams produced by the decommissioning process considered all options and services currently available to Xcel Energy. The majority of the low-level radioactive waste designated for direct disposal (Class A ^[14]) can be sent to EnergySolutions’ facility in Clive, Utah. Therefore, disposal costs for Class A waste were based upon current contract rates. This facility is not licensed to receive the higher activity portion of the decommissioning waste stream (Classes B and C resins and activated metal from the reactor vessel^[15]).

The Texas facility is licensed to receive the higher activity waste forms (Classes B and C). As such, for this analysis, disposal costs for the Class B and C waste were based upon the Xcel-provided information on the cost for such from WCS.

¹² “Low-Level Radioactive Waste Policy Act,” Public Law 96-573, 1980

¹³ “Low-Level Radioactive Waste Policy Amendments Act of 1985,” Public Law 99-240, 1986

¹⁴ Waste is classified in accordance with U.S. Code of Federal Regulations, Title 10, Part 61.55

¹⁵ U.S. Code of Federal Regulations, Title 10, Part 61, “Licensing Requirements for Land Disposal of Radioactive Waste”

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The dismantling of the components residing closest to the reactor core generates radioactive waste considered unsuitable for shallow-land disposal (i.e., low-level radioactive waste with concentrations of radionuclides that exceed the limits established by the NRC for Class C radioactive waste (GTCC)). The Low-Level Radioactive Waste Policy Amendments Act of 1985 assigned the federal government the responsibility for the disposal of this material. The Act also stated that the beneficiaries of the activities resulting in the generation of such radioactive waste bear all reasonable costs of disposing of such waste.

The DOE issued its final Environmental Impact Statement for the disposal of GTCC on January 2016.^[16] The study evaluated the potential environmental impacts associated with constructing and operating a new facility or using an existing facility, disposal methods, and locations. DOE is awaiting Congressional action on the report and its recommendations. At this time, the federal government has not identified a specific cost for disposing of GTCC or a schedule for acceptance.

For purposes of this analysis, the GTCC radioactive waste is assumed to be packaged and disposed of in a similar manner as high-level waste and at a cost equivalent to that envisioned for the spent fuel. The GTCC is packaged in the same canisters used for spent fuel and either stored on site or shipped directly to a DOE facility as it is generated (depending upon the timing of the decommissioning and whether the spent fuel has been removed from the site prior to the start of physical decommissioning).

A significant portion of the waste material generated during decommissioning may only be potentially contaminated by radioactive materials. This waste can be analyzed on site or shipped off site to licensed facilities for further analysis, for processing and/or for conditioning/recovery. Reduction in the volume of low-level radioactive waste requiring disposal in a licensed low-level radioactive waste disposal facility can be accomplished through a variety of methods, including analyses and surveys or decontamination to isolate the portion of waste that does not require disposal as radioactive waste, compaction, incineration or metal melt. The estimates reflect the savings from waste recovery/volume reduction.

High-Level Radioactive Waste Management

Congress passed the “Nuclear Waste Policy Act”^[17] (NWPA) in 1982, assigning the federal government’s long-standing responsibility for disposal of the spent nuclear fuel created by the commercial nuclear generating plants to the DOE. The DOE was to

¹⁶ “Final Environmental Impact Statement for the Disposal of Greater-Than-Class C (GTCC) Low-Level Radioactive Waste and GTCC-Like Waste (DOE/EIS-0375),” January 2016

¹⁷ “Nuclear Waste Policy Act of 1982 and Amendments,” DOE’s Office of Civilian Radioactive Management, 1982

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begin accepting spent fuel by January 31, 1998; however, to date no progress in the removal of spent fuel from commercial generating sites has been made.

Today, the country is at an impasse on high-level waste disposal, even with the License Application for a geologic repository submitted by the DOE to the NRC in 2008. The Obama administration cut the budget for the repository program while promising to “conduct a comprehensive review of policies for managing the back end of the nuclear fuel cycle ... and make recommendations for a new plan.”^[18] Towards this goal, the administration appointed a Blue Ribbon Commission on America’s Nuclear Future (Blue Ribbon Commission) to make recommendations for a new plan for nuclear waste disposal. The Blue Ribbon Commission’s charter includes a requirement that it consider “[o]ptions for safe storage of used nuclear fuel while final disposition pathways are selected and deployed.”^[19]

On January 26, 2012, the Blue Ribbon Commission issued its “Report to the Secretary of Energy” containing a number of recommendations on nuclear waste disposal. Two of the recommendations that may impact decommissioning planning are:

- “[T]he United States [should] establish a program that leads to the timely development of one or more consolidated storage facilities”^[20]
- “[T]he United States should undertake an integrated nuclear waste management program that leads to the timely development of one or more permanent deep geological facilities for the safe disposal of spent fuel and high-level nuclear waste.”^[21]

In January 2013, the DOE issued the “Strategy for the Management and Disposal of Used Nuclear Fuel and High-Level Radioactive Waste,” in response to the recommendations made by the Blue Ribbon Commission and as “a framework for moving toward a sustainable program to deploy an integrated system capable of transporting, storing, and disposing of used nuclear fuel...”^[22] This document states:

¹⁸ Blue Ribbon Commission on America’s Nuclear Future’s Charter, <http://cybercemetery.unt.edu/archive/brc/20120620215336/http://brc.gov/index.php?q=page/charter>

¹⁹ *Ibid.*

²⁰ “Blue Ribbon Commission on America’s Nuclear Future, Report to the Secretary of Energy,” p. 32, January 2012

²¹ *Ibid.*, p.27

²² “Strategy for the Management and Disposal of Used Nuclear Fuel and High-Level Radioactive Waste,” U.S. DOE, January 11, 2013

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“With the appropriate authorizations from Congress, the Obama Administration planned to implement a program over the next 10 years that would have:

- Sites, designs and licenses, constructs and begins operations of a pilot interim storage facility by 2021 with an initial focus on accepting used nuclear fuel from shut-down reactor sites;
- Advances toward the siting and licensing of a larger interim storage facility to be available by 2025 that will have sufficient capacity to provide flexibility in the waste management system and allows for acceptance of enough used nuclear fuel to reduce expected government liabilities; and
- Makes demonstrable progress on the siting and characterization of repository sites to facilitate the availability of a geologic repository by 2048.”^[23]

The NRC’s review of DOE’s license application to construct a geologic repository at Yucca Mountain was suspended in 2011 when the Obama Administration significantly reduced the budget for completing that work. However, the US Court of Appeals for the District of Columbia Circuit issued a writ of mandamus (in August 2013) ^[24] ordering NRC to comply with federal law and restart its review of DOE’s Yucca Mountain repository license application to the extent of previously appropriated funding for the review. That review is now complete with the publication of the five-volume safety evaluation report. A supplement to DOE’s environmental impact statement and an adjudicatory hearing on the contentions filed by interested parties must be completed before a licensing decision can be made. Although the DOE proposed it would start fuel acceptance in 2025, no progress has been made in the repository program since DOE’s 2013 strategy was issued except for the completion of the Yucca Mountain safety evaluation report.

Holtec International submitted a license application to the NRC on March 30, 2017 for a consolidated interim spent fuel storage facility in southeast New Mexico called HI-STORE CIS (Consolidated Interim Storage) under the provisions of 10 CFR Part 72. The application is currently under NRC review.

A centralized interim storage project was initiated by Waste Control Specialists (WCS) for a site in Andrews County, Texas, adjacent to WCS’s existing low-level radioactive waste and hazardous waste storage and disposal facilities. The NRC license application for this project was filed in April 2016. In April 2017, WCS

²³ *Ibid.*, p.2

²⁴ United States Court of Appeals for the District Of Columbia Circuit, In Re: Aiken County, et al, August 2013

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asked the NRC to suspend the review of this application. Subsequently, WCS and Orano USA (formerly Areva Nuclear Materials) formed a joint venture to license the facility. In response to letters to the NRC in June and July 2018 from the joint venture, Interim Storage Partners, the NRC restarted its review of the application

On May 10, 2018, the U.S. House of Representatives passed H.R. 3053, the “Nuclear Waste Policy Amendments Act of 2018.” Proposed to amend the Nuclear Waste Policy Act of 1982, the legislation, if approved by the Senate and signed by the President, would provide the DOE the authority to site, construct, and operate one or more Monitored Retrieval Storage (MRS) facilities while a permanent repository is licensed and constructed and/or to enter into an MRS agreement with a non-Federal entity for temporary storage.

Completion of the decommissioning process is dependent upon the DOE’s ability to remove spent fuel from the site in a timely manner. DOE’s repository program had originally assumed that spent fuel allocations would be accepted for disposal from the nation’s commercial nuclear plants, with limited exceptions, in the order (the “queue”) in which it was discharged from the reactor.^[25] However, the Blue Ribbon Commission, in its final report, noted that: “[A]ccepting spent fuel according to the OFF [Oldest Fuel First] priority ranking instead of giving priority to shutdown reactor sites could greatly reduce the cost savings that could be achieved through consolidated storage if priority could be given to accepting spent fuel from shutdown reactor sites before accepting fuel from still-operating plants. The magnitude of the cost savings that could be achieved by giving priority to shutdown sites appears to be large enough (i.e., in the billions of dollars) to warrant DOE exercising its right under the Standard Contract to move this fuel first.”

The state of Minnesota directed the Public Utilities Commission, “when considering approval of a plan for the accrual of funds for the decommissioning of nuclear facilities” ...to “include an evaluation of the costs, if any, arising from storage of used nuclear fuel that may be incurred by the state of Minnesota, and any tribal community, county, city, or township where used nuclear fuel is located following the cessation of operations at a nuclear plant.”^[26]

²⁵ U.S. Code of Federal Regulations, Title 10, Part 961.11, Article IV – Responsibilities of the Parties, B. DOE Responsibilities, 5.(a) ... DOE shall issue an annual acceptance priority ranking for receipt of SNF and/or HLW at the DOE repository. This priority ranking shall be based on the age of SNF and/or HLW as calculated from the date of discharge of such materials from the civilian nuclear power reactor. The oldest fuel or waste will have the highest priority for acceptance ...”

²⁶ Minnesota Statute 216B.2445, “Nuclear Power Plant Decommissioning and Storage of Used Nuclear Fuel”

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The state of Minnesota statute also prescribed the parameters to be used in evaluating spent fuel management costs. “To assist the commission in making the determination ... the filing shall provide cost estimates, including ratepayer impacts, assuming used nuclear fuel will be stored in the state for 60 years, 100 years, and 200 years following the cessation of operation of the nuclear plant.”^[27]

Xcel Energy’s current spent fuel management plan for the Prairie Island spent fuel is based in general upon:

- 1) Fuel transferred from the pool to the ISFSI within 4 years of shutdown;
- 2) Exchange of Prairie Island and Monticello spent fuel acceptance rights to best manage the overall cost of spent fuel storage for both plants;
- 3) Fuel will be shipped in the existing Transnuclear TN-40 casks, plus NUHOMS DSCs for fuel removed after final plant shutdown (Scenarios 1, 2, 5, and 6); the canisters and NUHOMS are periodically replaced in Scenarios 3, 4, 7 and 8. Spent fuel assemblies from TN-40 casks that are replaced will be put into NUHOMS DSCs. Canisters that are unloaded in the spent fuel transfer operation will be surveyed for neutron activation.
- 4) As an allowance, some of these canisters and NUHOMS modules from the first off-load operation are assumed to be mildly neutron activated and therefore must be disposed of as radioactive waste.
- 5) For the 100 and 200 year dry fuel storage scenarios (Scenarios 3, 4, 7 and 8) the canisters and casks will be replaced on a 50 year schedule using a dry transfer facility.^[28]

The NRC requires that licensees establish a program to manage and provide funding for the caretaking of all irradiated fuel at the reactor site until title of the fuel is transferred to the Secretary of Energy, pursuant to 10 CFR Part 50.54(bb).^[29] This requirement is prepared for through inclusion of certain cost elements in the decommissioning estimates, for example, associated with the isolation and continued operation of the spent fuel pool and the ISFSI.

²⁷ Ibid.

²⁸ “Order Approving Nuclear Decommissioning Study, Assumptions, and Annual Accrual, and Setting Filing Requirements”, Page 8, Items 12e and 12g, Minnesota Public Utilities Commission Docket E-002/M-14-761 October 4, 2015

²⁹ U.S. Code of Federal Regulations, Title 10, Part 50, “Domestic Licensing of Production and Utilization Facilities,” Subpart 54 (bb), “Conditions of Licenses”

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The spent fuel pool is expected to contain freshly discharged assemblies (from the most recent refueling cycles) as well as the final reactor cores at shutdown. The assemblies are packaged into dry shielded canisters (DSCs) over the first four years after shutdown for transfer to the ISFSI for interim storage. It is assumed that this period provides the necessary cooling for the final cores to meet the transport and/or storage requirements for decay heat.

An ISFSI, operated under a Part 72 Site Specific License (in accordance with 10 CFR 72³⁰), has been constructed to support continued plant operations. The facility is assumed to be expanded to support decommissioning. This will allow decommissioning activities to proceed within the auxiliary building.

DOE has breached its obligations to remove fuel from reactor sites, and has also failed to provide the plant owners with information about how it will ultimately perform. DOE officials have stated that DOE does not have an obligation to accept already-canistered fuel without an amendment to DOE's contracts with plant licensees to remove the fuel (the "Standard Contract"), but DOE has not explained what any such amendment would involve. Consequently, Xcel Energy has no information or expectations on how DOE will remove fuel from the site in the future. In the absence of information about how DOE will perform, and for purposes of this analysis only, it is assumed that DOE will accept already-canistered fuel. If this assumption is incorrect, it is assumed that DOE will have liability for costs incurred to transfer the fuel to DOE-supplied containers.

Xcel Energy's position is that the DOE has a contractual obligation to accept Prairie Island's fuel earlier than the projections set out above consistent with its contract commitments. No assumption made in this study should be interpreted to be inconsistent with this claim. However, including the cost of storing spent fuel in this study is appropriate to ensure the availability of sufficient decommissioning funds at the end of the station's life if the DOE has not met its obligation. The cost for the interim storage of spent fuel has been calculated and is separately presented as "Spent Fuel Management" expenditures in this report.

Site Restoration

The efficient removal of the contaminated materials at the site may result in damage to many of the site structures. Blasting, coring, drilling, and the other decontamination activities can substantially damage power block structures, potentially weakening the footings and structural supports. It is unreasonable to anticipate that these structures would be repaired and preserved after the radiological contamination is removed. The cost to dismantle site structures with a

³⁰ U.S. Code of Federal Regulations, Title 10, Part 72.40

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work force already mobilized is more efficient and less costly than if the process were deferred. Experience at shutdown generating stations has shown that plant facilities quickly degrade without maintenance, adding additional expense and creating potential hazards to the public and the demolition work force.

This estimate assumes that some site features will remain following the decommissioning project. These include the existing electrical switchyard, which is assumed to remain functional in support of the regional electrical distribution system. The existing shoreline will also be left intact.

Consequently, non-essential site structures addressed by this analysis are completely removed (including foundations) as required by Minnesota statute ^[31]. The site is then graded and stabilized. The cost for the site restoration of non-essential and/or non-contaminated structures has been calculated and is separately presented as "Site Restoration" expenditures in this report.

Summary

The costs to decommission the Prairie Island station were evaluated for several spent fuel removal scenarios, and using both the DECON and SAFSTOR decommissioning alternatives. Regardless of the timing of the decommissioning activities, the estimates to decommission Prairie Island assume the removal of all contaminated and activated plant components and structural materials such that Xcel Energy may then have unrestricted use of the site with no further requirements for any operating license. In most of the scenarios, spent fuel remains on site following the decommissioning and site restoration of the power block structures. The spent fuel remains in storage at the site until such time that the transfer to a DOE facility can be completed. Once the transfer is complete, the storage facilities are also decommissioned.

The alternatives evaluated in this analysis are described in Section 2. The assumptions are presented in Section 3, along with schedules of annual expenditures. The major cost contributors are identified in Section 6, with detailed activity costs, waste volumes, and associated manpower requirements delineated in Appendices C through J. The major cost components are also identified in the cost summary provided at the end of this section.

The estimates presented in this document reflect the total cost to decontaminate the nuclear units, manage the spent fuel until the DOE is able to complete the transfer to a federal facility, dismantle the plant and restore the site for alternative use.

³¹ Minnesota Administrative Rule part 7035.0400 "General Requirements"

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The cost elements in the estimates for the four spent fuel scenarios DECON and SAFSTOR alternatives are assigned to one of three subcategories: NRC License Termination (radiological remediation), Spent Fuel Management, and Site Restoration. The subcategory “NRC License Termination” is used to accumulate costs that are consistent with “decommissioning” as defined by the NRC in its financial assurance regulations (i.e., 10 CFR §50.75). The cost reported for this subcategory is generally sufficient to terminate the unit’s operating license, recognizing that there may be some additional cost impact from spent fuel management. The License Termination cost subcategory also includes costs to decommission the ISFSI (as required by 10 CFR §72.30). Section 3.4.1 provides the basis for the ISFSI decommissioning cost.

The “Spent Fuel Management” subcategory contains costs associated with the containerization and transfer of spent fuel from the wet storage pool to the ISFSI, as well as the transfer of the spent fuel in storage at the ISFSI to the DOE. Costs are included for the operation of the storage pool and the management of the ISFSI until such time that the transfer is complete. It does not include any spent fuel management expenses incurred prior to the cessation of plant operations, nor does it include any costs related to the final disposal of the spent fuel.

“Site Restoration” is used to capture costs associated with the dismantling and demolition of buildings and facilities demonstrated to be free from contamination. This includes structures never exposed to radioactive materials, as well as those facilities that have been decontaminated to appropriate levels. Structures are completely removed (including foundations) and backfilled to conform to local surface elevation.

It should be noted that the costs assigned to these subcategories are allocations. Delegation of cost elements is for the purposes of comparison (e.g., with NRC financial guidelines) or to permit specific financial treatment (e.g., Asset Retirement Obligation determinations). In reality, there can be considerable interaction between the activities in the three subcategories. For example, Xcel Energy may decide to remove non-contaminated structures early in the project to improve access to highly contaminated facilities or plant components. In these instances, the non-contaminated removal costs could be reassigned from Site Restoration to an NRC License Termination support activity. However, in general, the allocations represent a reasonable accounting of those costs that can be expected to be incurred for the specific subcomponents of the total estimated program cost, if executed as described.

As noted within this document, the estimates were developed and costs are presented in 2020 dollars. As such, the estimates do not reflect the escalation of costs (due to inflationary and market forces) over the remaining operating life of the plant or during the decommissioning period.

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Page xxiii of xxx****SCENARIO 1: DECON WITH 42 YEARS DFS
DECOMMISSIONING COST ELEMENTS**
(thousands of 2020 dollars)

| Cost Element | Unit 1 | Unit 2 | Total |
|--|----------------|------------------|------------------|
| Decontamination | 12,109 | 19,308 | 31,417 |
| Removal | 111,005 | 147,842 | 258,847 |
| Packaging | 27,756 | 28,136 | 55,892 |
| Transportation | 9,509 | 10,116 | 19,625 |
| Waste Disposal | 75,656 | 79,069 | 154,725 |
| Off-site Waste Processing | 26,049 | 30,811 | 56,860 |
| Program Management ^[1] | 239,340 | 227,121 | 466,461 |
| Site Security | 148,214 | 136,512 | 284,726 |
| Spent Fuel Pool Isolation | 14,576 | 9,718 | 24,294 |
| Spent Fuel Storage (Direct Costs) ^[2] | 114,819 | 111,649 | 226,467 |
| Insurance and Regulatory Fees | 19,822 | 16,763 | 36,586 |
| Energy | 10,742 | 9,033 | 19,775 |
| Characterization and Licensing Surveys | 14,531 | 16,907 | 31,438 |
| Property Taxes | 77,623 | 72,753 | 150,376 |
| Miscellaneous | 7,729 | 7,430 | 15,159 |
| Railroad Track Maintenance | 3,543 | 3,455 | 6,998 |
| Retention and Severance | 26,985 | 26,985 | 53,970 |
| Security Modifications | 5,000 | 5,000 | 10,000 |
| Prairie Island Indian Community | 51,745 | 50,219 | 101,964 |
| Total ^[3] | 996,753 | 1,008,829 | 2,005,582 |

| Cost Element | Unit 1 | Unit 2 | Total |
|-----------------------------|----------------|------------------|------------------|
| NRC License Termination | 595,962 | 590,962 | 1,186,924 |
| Spent Fuel Management | 349,793 | 345,097 | 694,890 |
| Site Restoration | 50,998 | 72,770 | 123,768 |
| Total ^[3] | 996,753 | 1,008,829 | 2,005,582 |

^[1] Includes engineering costs^[2] Includes costs for the dry storage system components, spent fuel loading and transfer, spent fuel pool O&M and EP fees, but excludes program management costs (staffing), security and other related costs^[3] Columns may not add due to rounding

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DECOMMISSIONING COST ELEMENTS**
(thousands of 2020 dollars)

| Cost Element | Unit 1 | Unit 2 | Total |
|--|------------------|------------------|------------------|
| Decontamination | 12,109 | 19,308 | 31,417 |
| Removal | 111,005 | 147,842 | 258,847 |
| Packaging | 27,756 | 28,136 | 55,892 |
| Transportation | 9,509 | 10,116 | 19,625 |
| Waste Disposal | 75,656 | 79,069 | 154,725 |
| Off-site Waste Processing | 26,049 | 30,811 | 56,860 |
| Program Management ^[1] | 241,656 | 229,438 | 471,094 |
| Site Security | 155,731 | 144,029 | 299,759 |
| Spent Fuel Pool Isolation | 14,576 | 9,718 | 24,294 |
| Spent Fuel Storage (Direct Costs) ^[2] | 116,766 | 113,596 | 230,362 |
| Insurance and Regulatory Fees | 20,622 | 17,563 | 38,185 |
| Energy | 10,742 | 9,033 | 19,775 |
| Characterization and Licensing Surveys | 14,531 | 16,907 | 31,438 |
| Property Taxes | 82,188 | 77,319 | 159,507 |
| Miscellaneous | 7,729 | 7,430 | 15,159 |
| Railroad Track Maintenance | 3,759 | 3,671 | 7,430 |
| Retention and Severance | 26,985 | 26,985 | 53,970 |
| Security Modifications | 5,000 | 5,000 | 10,000 |
| Prairie Island Indian Community | 55,496 | 53,970 | 109,466 |
| Total ^[3] | 1,017,865 | 1,029,941 | 2,047,805 |

| Cost Element | Unit 1 | Unit 2 | Total |
|-----------------------------|------------------|------------------|------------------|
| NRC License Termination | 595,962 | 590,962 | 1,186,924 |
| Spent Fuel Management | 370,904 | 366,208 | 737,113 |
| Site Restoration | 50,998 | 72,770 | 123,768 |
| Total ^[3] | 1,017,865 | 1,029,941 | 2,047,805 |

^[1] Includes engineering costs

^[2] Includes costs for the dry storage system components, spent fuel loading and transfer, spent fuel pool O&M and EP fees, but excludes program management costs (staffing), security and other related costs

^[3] Columns may not add due to rounding

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DECOMMISSIONING COST ELEMENTS**
(thousands of 2020 dollars)

| Cost Element | Unit 1 | Unit 2 | Total |
|--|------------------|------------------|------------------|
| Decontamination | 12,109 | 19,308 | 31,417 |
| Removal | 111,707 | 148,543 | 260,249 |
| Packaging | 27,756 | 28,136 | 55,892 |
| Transportation | 9,509 | 10,116 | 19,625 |
| Waste Disposal | 75,656 | 79,069 | 154,724 |
| Off-site Waste Processing | 26,049 | 30,811 | 56,860 |
| Program Management ^[1] | 323,909 | 311,690 | 635,599 |
| Site Security | 255,921 | 244,219 | 500,140 |
| Spent Fuel Pool Isolation | 14,576 | 9,718 | 24,294 |
| Spent Fuel Storage (Direct Costs) ^[2] | 425,553 | 422,384 | 847,937 |
| Insurance and Regulatory Fees | 31,282 | 28,223 | 59,505 |
| Energy | 10,742 | 9,033 | 19,775 |
| Characterization and Licensing Surveys | 14,531 | 16,907 | 31,438 |
| Property Taxes | 143,057 | 138,187 | 281,244 |
| Miscellaneous | 7,729 | 7,430 | 15,159 |
| Railroad Track Maintenance | 6,637 | 6,549 | 13,185 |
| Retention and Severance | 26,985 | 26,985 | 53,970 |
| Security Modifications | 5,000 | 5,000 | 10,000 |
| Prairie Island Indian Community | 105,493 | 103,966 | 209,459 |
| Total ^[3] | 1,634,199 | 1,646,275 | 3,280,474 |

| Cost Element | Unit 1 | Unit 2 | Total |
|-----------------------------|------------------|------------------|------------------|
| NRC License Termination | 596,408 | 591,409 | 1,187,817 |
| Spent Fuel Management | 985,833 | 981,137 | 1,966,970 |
| Site Restoration | 51,958 | 73,730 | 125,688 |
| Total ^[3] | 1,634,199 | 1,646,275 | 3,280,474 |

^[1] Includes engineering costs^[2] Includes costs for the dry storage system components, spent fuel loading and transfer, spent fuel pool O&M and EP fees, but excludes program management costs (staffing), security and other related costs^[3] Columns may not add due to rounding

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DECOMMISSIONING COST ELEMENTS**
(thousands of 2020 dollars)

| Cost Element | Unit 1 | Unit 2 | Total |
|--|------------------|------------------|------------------|
| Decontamination | 12,109 | 19,308 | 31,417 |
| Removal | 111,707 | 148,543 | 260,249 |
| Packaging | 27,756 | 28,136 | 55,892 |
| Transportation | 9,509 | 10,116 | 19,625 |
| Waste Disposal | 75,656 | 79,069 | 154,724 |
| Off-site Waste Processing | 26,049 | 30,811 | 56,860 |
| Program Management ^[1] | 468,903 | 456,684 | 925,587 |
| Site Security | 506,407 | 494,705 | 1,001,112 |
| Spent Fuel Pool Isolation | 14,576 | 9,718 | 24,294 |
| Spent Fuel Storage (Direct Costs) ^[2] | 859,315 | 856,146 | 1,715,461 |
| Insurance and Regulatory Fees | 57,933 | 54,874 | 112,807 |
| Energy | 10,742 | 9,033 | 19,775 |
| Characterization and Licensing Surveys | 14,531 | 16,907 | 31,438 |
| Property Taxes | 295,229 | 290,360 | 585,589 |
| Miscellaneous | 7,729 | 7,430 | 15,159 |
| Railroad Track Maintenance | 13,831 | 13,743 | 27,575 |
| Retention and Severance | 26,985 | 26,985 | 53,970 |
| Security Modifications | 5,000 | 5,000 | 10,000 |
| Prairie Island Indian Community | 230,489 | 228,963 | 459,452 |
| Total ^[3] | 2,774,456 | 2,786,532 | 5,560,987 |

| Cost Element | Unit 1 | Unit 2 | Total |
|-----------------------------|------------------|------------------|------------------|
| NRC License Termination | 596,408 | 591,409 | 1,187,817 |
| Spent Fuel Management | 2,126,089 | 2,121,393 | 4,247,483 |
| Site Restoration | 51,958 | 73,730 | 125,688 |
| Total ^[3] | 2,774,456 | 2,786,532 | 5,560,987 |

^[1] Includes engineering costs^[2] Includes costs for the dry storage system components, spent fuel loading and transfer, spent fuel pool O&M and EP fees, but excludes program management costs (staffing), security and other related costs^[3] Columns may not add due to rounding

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DECOMMISSIONING COST ELEMENTS**
(thousands of 2020 dollars)

| Cost Element | Unit 1 | Unit 2 | Total |
|--|------------------|------------------|------------------|
| Decontamination | 8,262 | 17,629 | 25,891 |
| Removal | 118,236 | 154,208 | 272,444 |
| Packaging | 21,286 | 21,654 | 42,940 |
| Transportation | 7,988 | 8,587 | 16,575 |
| Waste Disposal | 59,926 | 62,040 | 121,966 |
| Off-site Waste Processing | 26,624 | 31,387 | 58,012 |
| Program Management ^[1] | 321,644 | 315,246 | 636,891 |
| Site Security | 216,744 | 170,639 | 387,383 |
| Spent Fuel Pool Isolation | 14,576 | 9,718 | 24,294 |
| Spent Fuel Storage (Direct Costs) ^[2] | 109,664 | 106,495 | 216,159 |
| Insurance and Regulatory Fees | 47,122 | 43,899 | 91,021 |
| Energy | 21,571 | 21,262 | 42,833 |
| Characterization and Licensing Surveys | 15,797 | 18,173 | 33,970 |
| Property Taxes | 214,410 | 209,541 | 423,951 |
| Miscellaneous | 18,316 | 22,688 | 41,004 |
| Railroad Track Maintenance | 4,733 | 4,645 | 9,377 |
| Retention and Severance | 26,985 | 26,985 | 53,970 |
| Security Modifications | 5,000 | 5,000 | 10,000 |
| Prairie Island Indian Community | 51,745 | 50,219 | 101,964 |
| Total ^[3] | 1,310,629 | 1,300,016 | 2,610,645 |

| Cost Element | Unit 1 | Unit 2 | Total |
|-----------------------------|------------------|------------------|------------------|
| NRC License Termination | 970,442 | 944,187 | 1,914,629 |
| Spent Fuel Management | 281,510 | 275,338 | 556,848 |
| Site Restoration | 58,677 | 80,490 | 139,167 |
| Total ^[3] | 1,310,629 | 1,300,016 | 2,610,645 |

^[1] Includes engineering costs

^[2] Includes costs for the dry storage system components, spent fuel loading and transfer, spent fuel pool O&M and EP fees, but excludes program management costs (staffing), security and other related costs

^[3] Columns may not add due to rounding

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DECOMMISSIONING COST ELEMENTS**
(thousands of 2020 dollars)

| Cost Element | Unit 1 | Unit 2 | Total |
|--|------------------|------------------|------------------|
| Decontamination | 8,262 | 17,629 | 25,891 |
| Removal | 118,240 | 154,230 | 272,471 |
| Packaging | 21,286 | 21,654 | 42,940 |
| Transportation | 7,988 | 8,588 | 16,575 |
| Waste Disposal | 59,926 | 62,042 | 121,968 |
| Off-site Waste Processing | 26,624 | 31,387 | 58,012 |
| Program Management ^[1] | 322,356 | 318,247 | 640,604 |
| Site Security | 218,124 | 180,276 | 398,401 |
| Spent Fuel Pool Isolation | 14,576 | 9,718 | 24,294 |
| Spent Fuel Storage (Direct Costs) ^[2] | 111,541 | 108,372 | 219,913 |
| Insurance and Regulatory Fees | 47,872 | 44,607 | 92,479 |
| Energy | 21,571 | 21,262 | 42,833 |
| Characterization and Licensing Surveys | 15,797 | 18,173 | 33,970 |
| Property Taxes | 218,698 | 213,829 | 432,527 |
| Miscellaneous | 18,316 | 22,688 | 41,004 |
| Railroad Track Maintenance | 4,733 | 4,645 | 9,377 |
| Retention and Severance | 26,985 | 26,985 | 53,970 |
| Security Modifications | 5,000 | 5,000 | 10,000 |
| Prairie Island Indian Community | 55,496 | 53,970 | 109,466 |
| Total ^[3] | 1,323,393 | 1,323,304 | 2,646,697 |

| Cost Element | Unit 1 | Unit 2 | Total |
|-----------------------------|------------------|------------------|------------------|
| NRC License Termination | 968,306 | 952,576 | 1,920,882 |
| Spent Fuel Management | 296,410 | 290,238 | 586,648 |
| Site Restoration | 58,677 | 80,490 | 139,167 |
| Total ^[3] | 1,323,393 | 1,323,304 | 2,646,697 |

^[1] Includes engineering costs

^[2] Includes costs for the dry storage system components, spent fuel loading and transfer, spent fuel pool O&M and EP fees, but excludes program management costs (staffing), security and other related costs

^[3] Columns may not add due to rounding

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DECOMMISSIONING COST ELEMENTS**
(thousands of 2020 dollars)

| Cost Element | Unit 1 | Unit 2 | Total |
|--|------------------|------------------|------------------|
| Decontamination | 8,262 | 17,447 | 25,709 |
| Removal | 119,002 | 155,038 | 274,040 |
| Packaging | 25,596 | 25,964 | 51,560 |
| Transportation | 7,988 | 8,588 | 16,576 |
| Waste Disposal | 59,928 | 62,049 | 121,977 |
| Off-site Waste Processing | 26,624 | 31,387 | 58,012 |
| Program Management ^[1] | 359,684 | 363,609 | 723,293 |
| Site Security | 279,245 | 272,250 | 551,495 |
| Spent Fuel Pool Isolation | 14,576 | 9,718 | 24,294 |
| Spent Fuel Storage (Direct Costs) ^[2] | 420,010 | 416,736 | 836,746 |
| Insurance and Regulatory Fees | 57,899 | 54,267 | 112,167 |
| Energy | 21,590 | 21,282 | 42,872 |
| Characterization and Licensing Surveys | 15,797 | 18,173 | 33,970 |
| Property Taxes | 278,005 | 273,136 | 551,141 |
| Miscellaneous | 18,316 | 22,688 | 41,004 |
| Railroad Track Maintenance | 6,373 | 6,285 | 12,659 |
| Retention and Severance | 26,985 | 26,985 | 53,970 |
| Security Modifications | 5,000 | 5,000 | 10,000 |
| Prairie Island Indian Community | 105,493 | 103,966 | 209,459 |
| Total ^[3] | 1,856,374 | 1,894,569 | 3,750,943 |

| Cost Element | Unit 1 | Unit 2 | Total |
|-----------------------------|------------------|------------------|------------------|
| NRC License Termination | 963,420 | 983,908 | 1,947,327 |
| Spent Fuel Management | 836,113 | 832,007 | 1,668,119 |
| Site Restoration | 56,842 | 78,655 | 135,496 |
| Total ^[3] | 1,856,374 | 1,894,569 | 3,750,943 |

^[1] Includes engineering costs^[2] Includes costs for the dry storage system components, spent fuel loading and transfer, spent fuel pool O&M and EP fees, but excludes program management costs (staffing), security and other related costs^[3] Columns may not add due to rounding

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DECOMMISSIONING COST ELEMENTS**
(thousands of 2020 dollars)

| Cost Element | Unit 1 | Unit 2 | Total |
|--|------------------|------------------|------------------|
| Decontamination | 8,262 | 17,447 | 25,709 |
| Removal | 119,002 | 155,038 | 274,040 |
| Packaging | 25,596 | 25,964 | 51,560 |
| Transportation | 7,988 | 8,588 | 16,576 |
| Waste Disposal | 59,928 | 62,049 | 121,977 |
| Off-site Waste Processing | 26,624 | 31,387 | 58,012 |
| Program Management ^[1] | 504,679 | 508,603 | 1,013,282 |
| Site Security | 501,598 | 494,603 | 996,201 |
| Spent Fuel Pool Isolation | 14,576 | 9,718 | 24,294 |
| Spent Fuel Storage (Direct Costs) ^[2] | 853,529 | 850,323 | 1,703,853 |
| Insurance and Regulatory Fees | 84,550 | 80,918 | 165,469 |
| Energy | 21,590 | 21,282 | 42,872 |
| Characterization and Licensing Surveys | 15,797 | 18,173 | 33,970 |
| Property Taxes | 430,177 | 425,308 | 855,485 |
| Miscellaneous | 18,316 | 22,688 | 41,004 |
| Railroad Track Maintenance | 13,568 | 13,480 | 27,048 |
| Retention and Severance | 26,985 | 26,985 | 53,970 |
| Security Modifications | 5,000 | 5,000 | 10,000 |
| Prairie Island Indian Community | 230,489 | 228,963 | 459,452 |
| Total ^[3] | 2,968,256 | 3,006,518 | 5,974,774 |

| Cost Element | Unit 1 | Unit 2 | Total |
|-----------------------------|------------------|------------------|------------------|
| NRC License Termination | 963,419 | 983,907 | 1,947,327 |
| Spent Fuel Management | 1,947,994 | 1,943,956 | 3,891,950 |
| Site Restoration | 56,842 | 78,655 | 135,496 |
| Total ^[3] | 2,968,256 | 3,006,518 | 5,974,774 |

^[1] Includes engineering costs^[2] Includes costs for the dry storage system components, spent fuel loading and transfer, spent fuel pool O&M and EP fees, but excludes program management costs (staffing), security and other related costs^[3] Columns may not add due to rounding

1. INTRODUCTION

This report presents estimates of the cost to decommission the Prairie Island Nuclear Generating Plant (Prairie Island) and the operation and eventual decommissioning of the on-site Independent Spent Fuel Storage Installation (ISFSI) for the selected decommissioning scenarios following the scheduled cessation of plant operations. The estimates are designed to provide Xcel Energy with the information to assess its current decommissioning liability, as it relates to Prairie Island.

The analysis relies upon site-specific, technical information from an earlier evaluation prepared in 2017, ^[1]* updated to reflect current assumptions pertaining to the disposition of the nuclear plant and relevant industry experience in undertaking such projects. The costs are based on several key assumptions in areas of regulation, component characterization, high-level radioactive waste management, low-level radioactive waste disposal, performance uncertainties (contingency) and site restoration requirements.

The analysis is not a detailed engineering evaluation, but an estimate prepared in advance of the detailed engineering required to carry out the decommissioning of the nuclear units. It may also not reflect the actual plan to decommission Prairie Island; the plan may differ from the assumptions made in this analysis based on facts that exist at the time of decommissioning.

The 2017 plant inventory was reviewed for this analysis. It serves as the basis for the decontamination and dismantling requirements, cost, and the decommissioning waste streams. The review confirmed that there were no substantive changes to the configuration of the plant or site facilities that would impact decommissioning over the last three years.

1.1 OBJECTIVES OF STUDY

The objectives of this study are to prepare comprehensive estimates of the cost to decommission Prairie Island, to provide a sequence or schedule for the associated activities, and to develop waste stream projections from the decontamination and dismantling activities.

The operating licenses were originally issued for the plant in August 1973 and October 1974 for Units 1 and 2, respectively, and were valid for a period of 40

* Annotated references for citations in Sections 1-6 are provided in Section 7

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years. In April 2008, Nuclear Management Company (as agent for Xcel Energy), submitted an application for renewed licenses (i.e., 20 year extensions). The application was approved by the NRC in June 2011. Therefore, for the purposes of this study, final shutdown dates (license expiration) for Unit 1 and Unit 2 are August 9, 2033 and October 29, 2034, respectively, assuming a 60-year operating life (the current operating licenses' expiration dates).

1.2 SITE DESCRIPTION

Prairie Island is located in Goodhue County Minnesota, on the west bank of the Mississippi River, approximately 26 miles southeast of the Twin City Metropolitan Area and within the city limits of Red Wing.

The Nuclear Steam Supply System (NSSS) consists of a pressurized water reactor and a two-loop reactor coolant system. The system is comprised of the reactor vessel and two closed reactor coolant loops connected in parallel to the reactor vessel, each containing a reactor coolant pump and a steam generator. An electrically heated pressurizer is connected to one of the loops.

The system is housed within the reactor containment vessel, a free-standing cylindrical steel shell with a hemispherical dome and ellipsoidal bottom designed to withstand the internal pressure accompanying a loss-of-coolant accident. The reactor containment vessel is surrounded by a cylindrical shield building constructed of reinforced concrete, which serves as a radiation shielding for normal operations and for the loss-of-coolant condition.

Heat produced in the reactor is converted to electrical energy by the plant's power conversion system. A turbine-generator converts the thermal energy of steam produced in the steam generators into mechanical shaft power and then into electrical energy. The turbine-generator consists of one high-pressure, double-flow and two low-pressure, double-flow elements driving a direct-coupled generator at 1800 rpm. The turbines are operated in a closed feedwater cycle in which the steam is condensed and returned to the steam generators by the feedwater system.

Heat rejected in the main condensers is removed by the circulating water system, which provides the heat sink for the removal of the waste heat in the power plant's thermal cycle. The majority of the heat is removed through dilution with river water in the discharge canal. Forced draft cooling towers provide supplemental heat removal.

1.3 REGULATORY GUIDANCE

The Nuclear Regulatory Commission (NRC or Commission) provided initial decommissioning requirements in its rule "General Requirements for Decommissioning Nuclear Facilities," issued in June 1988.^[2] This rule set forth financial criteria for decommissioning licensed nuclear power facilities. The regulation addressed decommissioning planning needs, timing, funding methods, and environmental review requirements. The intent of the rule was to ensure that decommissioning would be accomplished in a safe and timely manner and that adequate funds would be available for this purpose. Subsequent to the rule, the NRC issued Regulatory Guide 1.159, "Assuring the Availability of Funds for Decommissioning Nuclear Reactors,^[3]" which provided additional guidance to the licensees of nuclear facilities on the financial methods acceptable to the NRC staff for complying with the requirements of the rule. The regulatory guide addressed the funding requirements and provided guidance on the content and form of the financial assurance mechanisms indicated in the rule.

The rule defined three decommissioning alternatives as being acceptable to the NRC: DECON, SAFSTOR, and ENTOMB. The DECON alternative assumes that any contaminated or activated portion of the plant's systems, structures, and facilities are removed or decontaminated to levels that permit the site to be released for unrestricted use shortly after the cessation of plant operations while the SAFSTOR and ENTOMB alternatives defer the process.

The rule also placed limits on the time allowed to complete the decommissioning process. For the SAFSTOR alternative, the process is restricted in overall duration to 60 years, unless it can be shown that a longer duration is necessary to protect public health and safety. The guidelines for ENTOMB are similar, providing the NRC with both sufficient leverage and flexibility to ensure that these deferred options are only used in situations where it is reasonable and consistent with the definition of decommissioning. At the conclusion of a 50 to 60-year dormancy period (or longer for ENTOMB if the NRC approves such a case), the site would still require significant remediation to meet the unrestricted release limits for license termination.

The ENTOMB alternative has not been viewed as a viable option for power reactors due to the significant time required to isolate the long-lived radionuclides for decay to permissible levels. However, with rulemaking permitting the controlled release of a site,^[4] the NRC did re-evaluate the alternative. The resulting feasibility study, based upon an assessment by Pacific Northwest National Laboratory, concluded that the method did have conditional merit for some, if not most reactors. The staff also found that

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additional rulemaking would be needed before this option could be treated as a generic alternative.

The NRC had considered rulemaking to alter the 60-year time for completing decommissioning and to clarify the use of engineered barriers for reactor entombments.^[5] However, the NRC's staff has recommended that rulemaking be deferred, based upon several factors, e.g., no licensee has committed to pursuing the entombment option, the unresolved issues associated with the disposition of greater-than-Class C material (GTCC), and the NRC's current priorities, at least until after the additional research studies are complete. The Commission concurred with the staff's recommendation. In a draft regulatory basis document published in March 2017 in support of rulemaking that would amend NRC regulations concerning nuclear plant decommissioning, the NRC staff proposes removing any discussion of the ENTOMB option from existing guidance documents since the method is not deemed practically feasible.

In 1996, the NRC published revisions to the general requirements for decommissioning nuclear power plants. ^[6] When the regulations were originally adopted in 1988, it was assumed that the majority of licensees would decommission at the end of the facility's operating licensed life. Since that time, several licensees permanently and prematurely ceased operations. Exemptions from certain operating requirements were required once the reactor was defueled to facilitate the decommissioning. Each case was handled individually, without clearly defined generic requirements. The NRC amended the decommissioning regulations in 1996 to clarify ambiguities and codify procedures and terminology as a means of enhancing efficiency and uniformity in the decommissioning process. The new amendments allow for greater public participation and better define the transition process from operations to decommissioning.

Under the revised regulations, licensees will submit written certification to the NRC within 30 days after permanent shutdown. Certification will also be required once the fuel is permanently removed from the reactor vessels. Submittal of these notices will entitle the licensee to a fee reduction and eliminate the obligation to follow certain requirements needed only during operation of the reactor. Prior to or within two years following permanent cessation of operations, the licensee is required to submit a Post-Shutdown Decommissioning Activities Report (PSDAR) to the NRC, and a copy to the affected State(s) (10 CFR 50.82(a)(4)(i)). The PSDAR describes the planned decommissioning activities, the associated sequence and schedule, and an estimate of expected costs. Prior to completing decommissioning, the licensee is required to submit applications to the NRC to terminate the license, which will include a License Termination Plan (LTP).

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In 2011, the NRC published amended regulations to improve decommissioning planning and thereby reduce the likelihood that any current operating facility will become a legacy site.^[7] The regulations require licensees to report additional details in their decommissioning cost estimate including a decommissioning estimate for the ISFSI. This estimate is provided in Appendix K.

1.3.1 High-Level Radioactive Waste Management

Congress passed the “Nuclear Waste Policy Act” ^[8] (NWPA) in 1982, assigning the federal government’s long-standing responsibility for disposal of the spent nuclear fuel created by the commercial nuclear generating plants to the DOE. The DOE was to begin accepting spent fuel by January 31, 1998; however, to date no progress in the removal of spent fuel from commercial generating sites has been made.

Today, the country is at an impasse on high-level waste disposal, even with the License Application for a geologic repository submitted by the DOE to the NRC in 2008. The Obama administration cut the budget for the repository program while promising to “conduct a comprehensive review of policies for managing the back end of the nuclear fuel cycle ... and make recommendations for a new plan.” Towards this goal, the administration appointed a Blue Ribbon Commission on America’s Nuclear Future (Blue Ribbon Commission) to make recommendations for a new plan for nuclear waste disposal. The Blue Ribbon Commission’s charter includes a requirement that it consider “[o]ptions for safe storage of used nuclear fuel while final disposition pathways are selected and deployed.”^[9]

On January 26, 2012, the Blue Ribbon Commission issued its “Report to the Secretary of Energy” containing a number of recommendations on nuclear waste disposal. Two of the recommendations that may impact decommissioning planning are:

- “[T]he United States [should] establish a program that leads to the timely development of one or more consolidated storage facilities”^[10]
- “[T]he United States should undertake an integrated nuclear waste management program that leads to the timely development of one or more permanent deep geological facilities for the safe disposal of spent fuel and high-level nuclear waste.”

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In January 2013, the DOE issued the “Strategy for the Management and Disposal of Used Nuclear Fuel and High-Level Radioactive Waste,” in response to the recommendations made by the Blue Ribbon Commission and as “a framework for moving toward a sustainable program to deploy an integrated system capable of transporting, storing, and disposing of used nuclear fuel...”^[11] This document states:

“With the appropriate authorizations from Congress, the Obama Administration planned to implement a program over the next 10 years that would have:

- Sites, designs and licenses, constructs and begins operations of a pilot interim storage facility by 2021 with an initial focus on accepting used nuclear fuel from shut-down reactor sites;
- Advances toward the siting and licensing of a larger interim storage facility to be available by 2025 that will have sufficient capacity to provide flexibility in the waste management system and allows for acceptance of enough used nuclear fuel to reduce expected government liabilities; and
- Makes demonstrable progress on the siting and characterization of repository sites to facilitate the availability of a geologic repository by 2048.”

The NRC’s review of DOE’s license application to construct a geologic repository at Yucca Mountain was suspended in 2011 when the Obama Administration significantly reduced the budget for completing that work. However, the US Court of Appeals for the District of Columbia Circuit issued a writ of mandamus (in August 2013)^[12] ordering NRC to comply with federal law and restart its review of DOE’s Yucca Mountain repository license application to the extent of previously appropriated funding for the review. That review is now complete with the publication of the five-volume safety evaluation report. A supplement to DOE’s environmental impact statement and an adjudicatory hearing on the contentions filed by interested parties must be completed before a licensing decision can be made. Although the DOE proposed it would start fuel acceptance in 2025, no progress has been made in the repository program since DOE’s 2013 strategy was issued except for the completion of the Yucca Mountain safety evaluation report.

Holtec International submitted a license application to the NRC on March 30, 2017 for a consolidated interim spent fuel storage facility in southeast New Mexico called HI-STORE CIS (Consolidated Interim

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Storage) under the provisions of 10 CFR Part 72. The application is currently under NRC review.

A centralized interim storage project was initiated by Waste Control Specialists (WCS) for a site in Andrews County, Texas, adjacent to WCS's existing low-level radioactive waste and hazardous waste storage and disposal facilities. The NRC license application for this project was filed in April 2016. In April 2017, WCS asked the NRC to suspend the review of this application. Subsequently, WCS and Orano USA (formerly Areva Nuclear Materials) formed a joint venture to license the facility. In response to letters to the NRC in June and July 2018 from the joint venture, Interim Storage Partners, the NRC restarted its review of the application.

On May 10, 2018, the U.S. House of Representatives passed H.R. 3053, the "Nuclear Waste Policy Amendments Act of 2018." Proposed to amend the Nuclear Waste Policy Act of 1982, the legislation, if approved by the Senate and signed by the President, would provide the DOE the authority to site, construct, and operate one or more Monitored Retrieval Storage (MRS) facilities while a permanent repository is licensed and constructed and/or to enter into an MRS agreement with a non-Federal entity for temporary storage.

Completion of the decommissioning process is dependent upon the DOE's ability to remove spent fuel from the site in a timely manner. DOE's repository program had originally assumed that spent fuel allocations would be accepted for disposal from the nation's commercial nuclear plants, with limited exceptions, in the order (the "queue") in which it was discharged from the reactor.^[13] However, the Blue Ribbon Commission, in its final report, noted that: "[A]ccepting spent fuel according to the OFF [Oldest Fuel First] priority ranking instead of giving priority to shutdown reactor sites could greatly reduce the cost savings that could be achieved through consolidated storage if priority could be given to accepting spent fuel from shutdown reactor sites before accepting fuel from still-operating plants. The magnitude of the cost savings that could be achieved by giving priority to shutdown sites appears to be large enough (i.e., in the billions of dollars) to warrant DOE exercising its right under the Standard Contract to move this fuel first."

The state of Minnesota directed the Public Utilities Commission, "when considering approval of a plan for the accrual of funds for the decommissioning of nuclear facilities" ...to "include an evaluation of the

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costs, if any, arising from storage of used nuclear fuel that may be incurred by the state of Minnesota, and any tribal community, county, city, or township where used nuclear fuel is located following the cessation of operations at a nuclear plant.”^[14]

The state of Minnesota statute also prescribed the parameters to be used in evaluating spent fuel management costs. “To assist the commission in making the determination ... the filing shall provide cost estimates, including ratepayer impacts, assuming used nuclear fuel will be stored in the state for 60 years, 100 years, and 200 years following the cessation of operation of the nuclear plant.”

Xcel Energy’s current spent fuel management plan for the Prairie Island spent fuel is based in general upon:

- 1) Fuel transferred from the pool to the ISFSI within 4 years of shutdown;
- 2) Exchange of Prairie Island and Monticello spent fuel acceptance rights to best manage the overall cost of spent fuel storage for both plants;
- 3) Fuel will be shipped in the existing Transnuclear TN-40 casks, plus NUHOMS DSCs for fuel removed after final plant shutdown (Scenarios 1, 2, 5, and 6); the canisters and NUHOMS are periodically replaced in Scenarios 3, 4, 7 and 8. Spent fuel assemblies from TN-40 casks that are replaced will be put into NUHOMS DSCs. Canisters that are unloaded in the spent fuel transfer operation will be surveyed for neutron activation.
- 4) As an allowance, some of these canisters and NUHOMS modules from the first off-load operation are assumed to be mildly neutron activated and therefore must be disposed of as radioactive waste.
- 5) For the 100 and 200 year dry fuel storage scenarios (Scenarios 3, 4, 7 and 8) the canisters and casks will be replaced on a 50 year schedule using a dry transfer facility. ^[15]

The NRC requires that licensees establish a program to manage and provide funding for the caretaking of all irradiated fuel at the reactor site until title of the fuel is transferred to the Secretary of Energy, pursuant to 10 CFR Part 50.54(bb). ^[16] This requirement is prepared for through inclusion of certain cost elements in the decommissioning estimates, for example, associated with the isolation and continued operation of the spent fuel pool and the ISFSI.

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The spent fuel pool is expected to contain freshly discharged assemblies (from the most recent refueling cycles) as well as the final reactor cores at shutdown. In the DECON and SAFSTOR scenarios, the assemblies are packaged into dry shielded canisters (DSCs) over the first four years after shutdown for transfer to the ISFSI for interim storage. It is assumed that this period provides the necessary cooling for the final cores to meet the transport and/or storage requirements for decay heat.

An ISFSI, operated under a Part 72 Site Specific License (in accordance with 10 CFR 72^[17]), has been constructed to support continued plant operations. The facility is assumed to be expanded to support decommissioning. This will allow decommissioning activities to proceed within the auxiliary building.

DOE has breached its obligations to remove fuel from reactor sites, and has also failed to provide the plant owners with information about how it will ultimately perform. DOE officials have stated that DOE does not have an obligation to accept already-canistered fuel without an amendment to DOE's contracts with plant licensees to remove the fuel (the "Standard Contract"), but DOE has not explained what any such amendment would involve. Consequently, Xcel Energy has no information or expectations on how DOE will remove fuel from the site in the future. In the absence of information about how DOE will perform, and for purposes of this analysis only, it is assumed that DOE will accept already-canistered fuel. If this assumption is incorrect, it is assumed that DOE will have liability for costs incurred to transfer the fuel to DOE-supplied containers.

Xcel Energy's position is that the DOE has a contractual obligation to accept Prairie Island's fuel earlier than the projections set out above, consistent with its contract commitments. No assumption made in this study should be interpreted to be inconsistent with this claim. However, including the cost of storing spent fuel in this study is appropriate to ensure the availability of sufficient decommissioning funds at the end of the station's life if the DOE has not met its obligation. The cost for the interim storage of spent fuel has been calculated and is separately presented as "Spent Fuel Management" expenditures in this report.

1.3.2 Low-Level Radioactive Waste Disposal

The contaminated and activated material generated in the decontamination and dismantling of a commercial nuclear reactor is classified as low-level (radioactive) waste, although not all of the material is suitable for "shallow-land" disposal. With the passage of the

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“Low-Level Radioactive Waste Policy Act” in 1980, ^[18] and its Amendments of 1985, ^[19] the states became ultimately responsible for the disposition of low-level radioactive waste generated within their own borders. It was expected that groups of states would combine together to jointly deal with their radioactive wastes; these organizations are referred to as waste disposal compacts.

With the exception of Texas, no new compact facilities have been successfully sited, licensed, and constructed. The Texas Compact disposal facility is now operational and waste is being accepted from generators within the Compact by the operator, Waste Control Specialists (WCS). The facility is also able to accept limited quantities of non-Compact waste.

Disposition of the various waste streams produced by the decommissioning process considered all options and services currently available to Xcel Energy. The majority of the low-level radioactive waste designated for direct disposal (Class A ^[20]) can be sent to EnergySolutions’ facility in Clive, Utah. Therefore, disposal costs for Class A waste were based upon current contract rates. This facility is not licensed to receive the higher activity portion (Classes B and C) of the decommissioning waste stream.

The Texas facility is licensed to receive the higher activity waste forms (Classes B and C). As such, for this analysis, disposal costs for the Class B and C waste were based upon the preliminary and indicative information on the cost for such from WCS.

The dismantling of the components residing closest to the reactor core generates radioactive waste considered unsuitable for shallow-land disposal (i.e., low-level radioactive waste with concentrations of radionuclides that exceed the limits established by the NRC for Class C radioactive waste (GTCC)). The Low-Level Radioactive Waste Policy Amendments Act of 1985 assigned the federal government the responsibility for the disposal of this material. The Act also stated that the beneficiaries of the activities resulting in the generation of such radioactive waste bear all reasonable costs of disposing of such waste.

The DOE issued its final Environmental Impact Statement for the disposal of GTCC on January 2016.^[21] The study evaluated the potential environmental impacts associated with constructing and operating a new facility or using an existing facility, disposal methods, and locations. DOE is awaiting Congressional action on the report and its recommendations. At this time, the federal government has not

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identified a specific cost for disposing of GTCC or a schedule for acceptance.

For purposes of this analysis, the GTCC radioactive waste is assumed to be packaged and disposed of in a similar manner as high-level waste and at a cost equivalent to that envisioned for the spent fuel. The GTCC is packaged in the same canisters used for spent fuel and either stored on site or shipped directly to a DOE facility as it is generated (depending upon the timing of the decommissioning and whether the spent fuel has been removed from the site prior to the start of decommissioning).

A significant portion of the metallic waste material generated during decommissioning may only be potentially contaminated by radioactive materials. This waste can be surveyed on site or shipped off site to licensed facilities for further analysis, for processing and/or for conditioning/recovery. Reduction in the volume of low-level radioactive waste requiring disposal in a licensed low-level radioactive waste disposal facility can be accomplished through a variety of methods, including analyses and surveys or decontamination to isolate the portion of waste that does not require disposal as radioactive waste, compaction, incineration or metal melt. The estimates reflect the savings from waste recovery/volume reduction.

1.3.3 Radiological Criteria for License Termination

In 1997, the NRC published Subpart E, “Radiological Criteria for License Termination,”^[22] amending 10 CFR §20. This subpart provides radiological criteria for releasing a facility for unrestricted use. The regulation states that the site can be released for unrestricted use if radioactivity levels are such that the average member of a critical group would not receive a Total Effective Dose Equivalent (TEDE) in excess of 25 millirem per year, and provided that residual radioactivity has been reduced to levels that are As Low As Reasonably Achievable (ALARA). The decommissioning estimates assume that the Prairie Island site will be remediated to a residual level consistent with the NRC-prescribed level.

It should be noted that the NRC and the Environmental Protection Agency (EPA) differ on the amount of residual radioactivity considered acceptable in site remediation. The EPA has two limits that apply to radioactive materials. An EPA limit of 15 millirem per year is derived from criteria established by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund).^[23]

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An additional and separate limit of 4 millirem per year, as defined in 40 CFR §141.66, is applied to drinking water. ^[24]

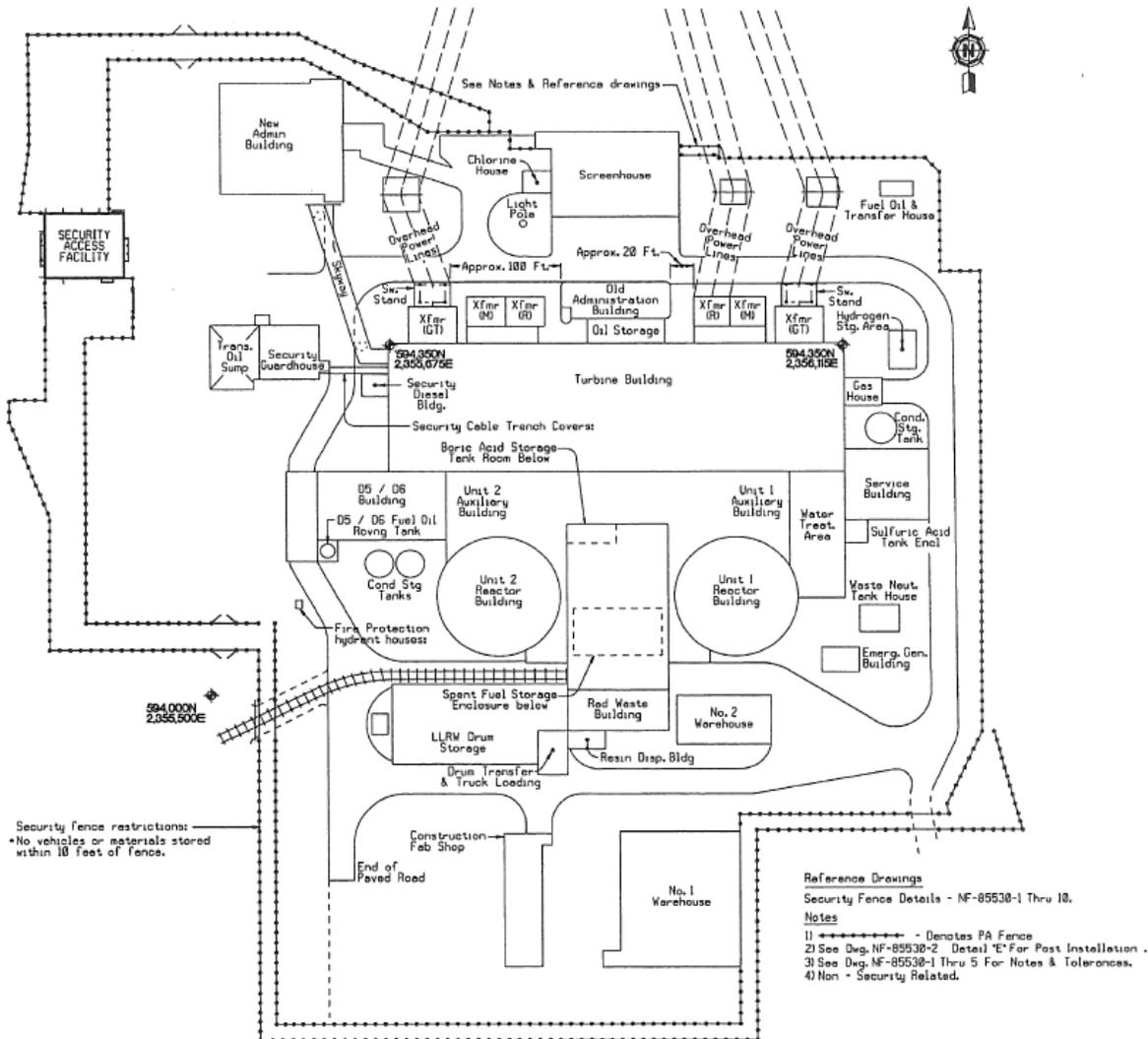
On October 9, 2002, the NRC signed an agreement with the EPA on the radiological decommissioning and decontamination of NRC-licensed sites. The Memorandum of Understanding (MOU) ^[25] provides that EPA will defer exercise of authority under CERCLA for the majority of facilities decommissioned under NRC authority. The MOU also includes provisions for NRC and EPA consultation for certain sites when, at the time of license termination, (1) groundwater contamination exceeds EPA-permitted levels; (2) NRC contemplates restricted release of the site; and/or (3) residual radioactive soil concentrations exceed levels defined in the MOU.

The MOU does not impose any new requirements on NRC licensees and should reduce the involvement of the EPA with NRC licensees who are decommissioning. Most sites are expected to meet the NRC criteria for unrestricted use, and the NRC believes that only a few sites will have groundwater or soil contamination in excess of the levels specified in the MOU that trigger consultation with the EPA. However, if there are other hazardous materials on the site, the EPA may be involved in the cleanup. As such, the possibility of dual regulation remains for certain licensees. The present study does not include any costs for this occurrence.

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**FIGURE 1.1
 PRAIRIE ISLAND NUCLEAR GENERATING PLANT
 GENERAL PLAN**



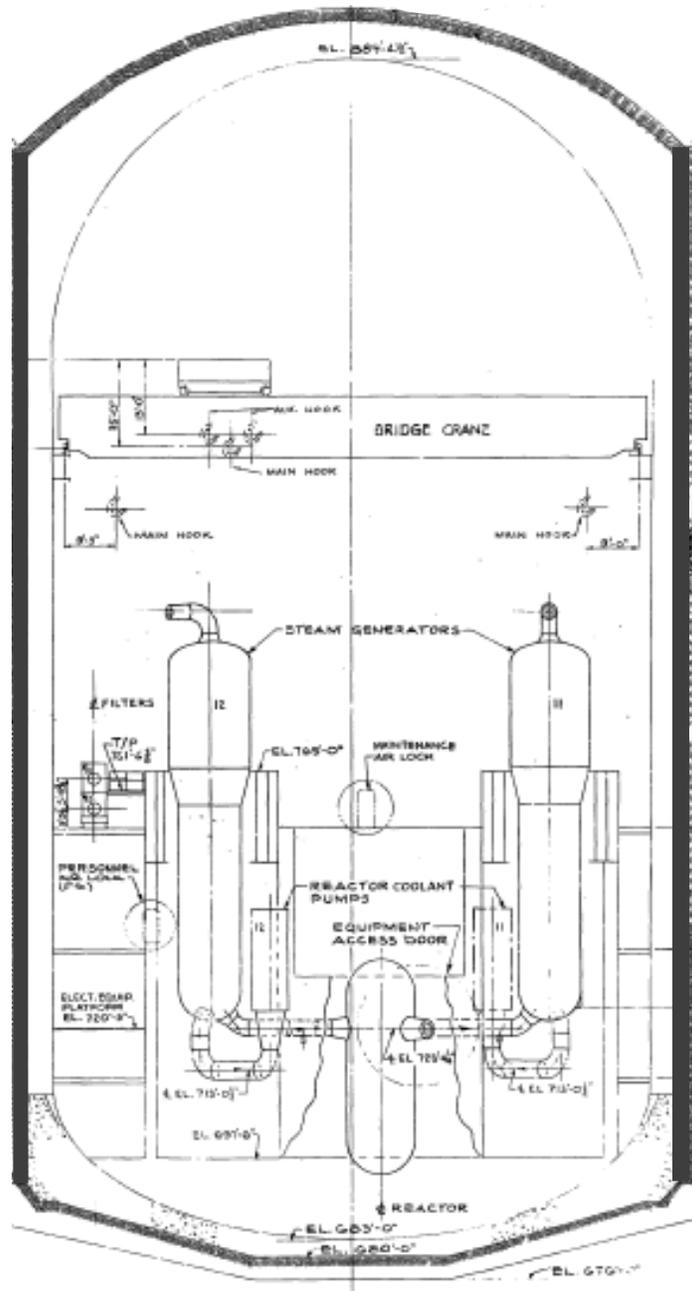
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**FIGURE 1.2
PRAIRIE ISLAND NUCLEAR GENERATING PLANT
AERIAL VIEW**



**FIGURE 1.3
PRAIRIE ISLAND NUCLEAR GENERATING PLANT
REACTOR BUILDING SECTION**



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Section 2, Page 1 of 15****2. DECOMMISSIONING ALTERNATIVES**

Detailed cost estimates were developed to decommission Prairie Island based upon the approved decommissioning alternatives: DECON and SAFSTOR. Although the alternatives differ with respect to technique, process, cost, and schedule, they attain the same result: the ultimate release of the site for unrestricted use.

The following scenarios were evaluated and are intended to bound the liability associated with the removal of spent fuel from the site. The current operating licenses expire in 2033 and 2034. The scenarios consist of four spent fuel management scenarios, each with a DECON and a SAFSTOR decommissioning scenario for eight total scenarios. The duration of the spent fuel scenarios has little impact to the decommissioning costs and timing of the power block systems and structures. The spent fuel in the plant's spent fuel storage pool is transferred to the ISFSI within the first four years. The equipment, structures, and portions of the plant containing radioactive contaminants are removed or decontaminated to a level that permits the facility to be released for unrestricted use. Non-essential structures are then demolished. Spent fuel storage operations continue at the ISFSI until the transfer of the fuel to the DOE is completed (as shown in the "Last Spent Fuel Assembly" column in the following table).

| Scenario | 1 st Spent Fuel Canister Replacement | 1 st Spent Fuel Assembly Removed from Prairie Island | Last Spent Fuel Assembly Removed from Prairie Island | Scenario Identification |
|----------|---|---|--|-------------------------------------|
| 1 | n/a | 2037 | 2074 | DECON with 42 Year DFS ⁺ |
| 2 | n/a | 2053 | 2077 | DECON with 60 Year DFS |
| 3 | 2045 | 2093 | 2117 | DECON with 100 Year DFS |
| 4 | 2045 | 2193 | 2217 | DECON with 200 Year DFS |
| 5 | n/a | 2037 | 2074 | SAFSTOR with 42 Year DFS |
| 6 | n/a | 2053 | 2077 | SAFSTOR with 60 Year DFS |
| 7 | 2045 | 2093 | 2117 | SAFSTOR with 100 Year DFS |
| 8 | 2045 | 2193 | 2217 | SAFSTOR with 200 Year DFS |

⁺ Dry Fuel Storage

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For Scenarios 1 and 5, although they only provide a total fuel storage period of 42 years following Unit 2 shutdown, some of the Prairie Island casks have been in storage since 1995. Xcel Energy directed TLG Services to not include the cost of transferring the spent fuel in dry storage to new canisters for those casks that exceed 50 years. The assumption to not transfer spent fuel at 50-years total storage duration for these two scenarios was premised on the likelihood that the life of the canisters could be successfully extended for the additional years.

For Scenarios 2 and 6, although they provide a total fuel storage period of nominally 60 years following shutdown, Xcel Energy directed TLG Services to not include the cost of transferring the spent fuel in dry storage to new canisters at the 50-year mark.

In Scenarios 3, 4, 7 and 8, the Dry Shielded Canisters (DSCs) are assumed to be replaced after fifty years of use. Since the auxiliary building spent fuel storage pool and fuel handling facilities are removed by the year 2037, a dry fuel transfer facility is assumed to be constructed on site to perform the transfers from the old to the new DSCs. For Scenarios 3 and 7, two such transfers are needed over the time frame assumed. For Scenarios 4 and 8, the spent fuel will be transferred four times following initial placement in the ISFSI.

The following sections describe the basic activities associated with each alternative. Although detailed procedures for each activity identified are not provided, and the actual sequence of work may vary, the activity descriptions provide a basis not only for estimating but also for the expected scope of work (i.e., engineering and planning at the time of decommissioning).

The conceptual approach that the NRC has described in its regulations divides decommissioning into three phases. The initial phase commences with the effective date of permanent cessation of operations and involves the transition of both plant and licensee from reactor operations (i.e., power production) to facilitate deactivation and closure. During the first phase, notification is to be provided to the NRC certifying the permanent cessation of operations and the removal of fuel from the reactor vessels. The licensee would then be prohibited from reactor operation.

The second phase encompasses activities during the storage period or during major decommissioning activities, or a combination of the two. The third phase pertains to the activities involved in license termination. The decommissioning estimates developed for Prairie Island are also divided into phases or periods; however, demarcation of the phases is based upon major milestones within the project or significant changes in the projected expenditures.

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2.1 DECON

The DECON alternative, as defined by the NRC, is "the alternative in which the equipment, structures, and portions of a facility and site containing radioactive contaminants are removed or decontaminated to a level that permits the property to be released for unrestricted use shortly after cessation of operations." This study does not address the cost to dispose of the spent fuel residing at the site; such costs are funded through a surcharge on electrical generation. However, the study does estimate the costs incurred with the interim on-site storage of the fuel pending shipment by the DOE to an off-site disposal facility. Those costs are separately presented as "Spent Fuel Management" expenditures in this report.

2.1.1 Period 1 - Preparations

In anticipation of the cessation of plant operations, detailed preparations are undertaken to provide a smooth transition from plant operations to site decommissioning. Through implementation of a staffing transition plan, the organization required to manage the intended decommissioning activities is assembled from available plant staff and outside resources. Preparations include the planning for permanent defueling of the reactor, revision of technical specifications applicable to the operating conditions and requirements, a characterization of the facility and major components, and the development of the PSDAR.

Engineering and Planning

The PSDAR, required prior to, or within two years of permanent cessation of operations, provides a description of the licensee's planned decommissioning activities, a timetable, a site-specific decommissioning cost estimate, and the associated financial requirements of the intended decommissioning program. Upon receipt of the PSDAR, the NRC will make the document available to the public for comment in a local meeting to be held in the vicinity of the reactor site. Ninety days following submittal and NRC receipt of the PSDAR, the licensee may begin to perform major decommissioning activities under a modified 10 CFR §50.59 procedure, (10 CFR §50.59 establishes the conditions under which licensees may make changes to the facility or procedures and conduct test or experiments, i.e., without prior NRC approval). Major activities are defined as any activity that results in permanent removal of major radioactive components, permanently modifies the structure of the containment, or results in dismantling components (for shipment)

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containing GTCC, as defined by 10 CFR §61. Major components are further defined as comprising the reactor vessel and internals, large bore reactor coolant system piping, and other large components that are radioactive. The NRC includes the following additional criteria for use of the §50.59 process in decommissioning. The proposed activity must not:

- foreclose release of the site for possible unrestricted use,
- significantly increase decommissioning costs,
- cause any significant environmental impact not previously reviewed, or
- result in there no longer being reasonable assurance that adequate funds will be available for decommissioning

Existing operational technical specifications are reviewed and modified to reflect plant conditions and the safety concerns associated with permanent cessation of operations. The environmental impact associated with the planned decommissioning activities is also considered. Typically, a licensee will not be allowed to proceed if the consequences of a particular decommissioning activity are greater than that bounded by previously evaluated environmental assessments or impact statements. In this instance, the licensee would have to submit a license amendment for the specific activity and update the environmental report.

The decommissioning program outlined in the PSDAR will be designed to accomplish the required tasks within the ALARA guidelines (as defined in 10 CFR §20) for protection of personnel from exposure to radiation hazards. It will also address the continued protection of the health and safety of the public and the environment during the dismantling activity. Consequently, with the development of the PSDAR, activity specifications, cost-benefit and safety analyses, and work packages and procedures, would be assembled to support the proposed decontamination and dismantling activities.

Site Preparations

Following final plant shutdown, and in preparation for actual decommissioning activities, the following activities are initiated:

- Characterization of the site and surrounding environs. This includes radiation surveys of work areas, major components (including the

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reactor vessel and its internals), internal piping, and primary shield cores.

- An ISFSI has been constructed to support continued plant operation and will need to be expanded following the cessation of operations to offload the spent fuel pool in support of the decommissioning program.
- Isolation of the spent fuel storage pool and fuel handling systems, such that decommissioning operations can commence on the balance of the plant. Decommissioning operations are scheduled around the fuel handling area to optimize the overall project schedule. It is assumed that the fuel pool remains operational for the transfer of fuel for approximately four years following the cessation of operations.
- Specification of transport and disposal requirements for activated materials and/or hazardous materials, including shielding and waste stabilization.
- Development of procedures for occupational exposure control, control and release of liquid and gaseous effluent, processing of radwaste (including dry-active waste, resins, filter media, metallic and non-metallic components generated in decommissioning), site security and emergency programs, and industrial safety.
- Perform chemical decontamination of the NSSS to reduce radiation levels in support of removal operations.

2.1.2 Period 2 - Decommissioning Operations

This period includes the physical decommissioning activities associated with the removal and disposal of contaminated and activated components and structures, including the successful amendment of the 10 CFR §50 operating licenses (releasing the site, exclusive of the ISFSI). Significant decommissioning activities in this phase include:

- Construction of temporary facilities and/or modification of existing facilities to support dismantling activities. This may include a centralized processing area to facilitate equipment removal and component preparations for off-site disposal.
- Reconfiguration and modification of site structures and facilities as needed to support decommissioning operations. This may include the upgrading of roads (on- and off-site) to facilitate hauling and transport. Modifications may be required to the containment

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structure to facilitate access of large/heavy equipment. Modifications may also be required to the refueling area of the building to support the segmentation of the reactor vessel internals and component extraction.

- Transfer of the spent fuel from the spent fuel storage pool to the ISFSI pad for interim storage.
- Design and fabrication of temporary and permanent shielding to support removal and transportation activities, construction of contamination control envelopes, and the procurement of specialty tooling.
- Procurement (lease or purchase) of shipping canisters, cask liners, and industrial packages.
- Decontamination of components and piping systems as required to control (minimize) worker exposure.
- Removal of piping and components no longer essential to support decommissioning operations.
- Removal of control rod drive housings and the head service structure from reactor vessel head. Segment the vessel closure head.
- Removal and segmentation of the upper internals assemblies. Segmentation will maximize the loading of the shielded transport casks, (i.e., by weight and activity). The operations are conducted under water using remotely operated tooling and contamination controls.
- Disassembly and segmentation of the remaining reactor internals, including the core former and lower core support assembly. Some material is expected to exceed Class C disposal requirements. As such, the segments will be packaged in modified spent fuel storage canisters for geologic disposal.
- Segmentation of the reactor vessel. A shielded platform is installed for segmentation as cutting operations are performed in air using remotely operated equipment within a contamination control envelope. The water level is maintained just below the cut to minimize the working area dose rates. Segments are transferred in-air to containers that are stored under water, for example, in an isolated area of the refueling canal.
- Removal of the activated portions of the concrete biological shield and accessible contaminated concrete surfaces. If dictated by the steam generator and pressurizer removal scenarios, those portions of the

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associated cubicles necessary for access and component extraction are removed.

- Removal of the steam generators and pressurizer for material recovery and controlled disposal. The generators will be moved to an on-site processing center, the steam domes are removed and the internal components segregated for off-site processing. The lower shell and tube bundle will be packaged for direct disposal. These components can serve as their own burial containers provided that all penetrations are properly sealed and the internal contaminants are stabilized. Steel shielding is added, as necessary, to those external areas of the steam generators to meet transportation limits and regulations.
- Expansion of the ISFSI and transfer of the spent fuel from the storage pool to the ISFSI pad for interim storage. Spent fuel storage operations continue throughout the active decommissioning period. Fuel transfer to DOE is expected to be completed by the end of the year 2074 (Scenario 1).

At least two years prior to the anticipated date of license termination, an LTP is required. Submitted as a supplement to the Final Safety Analysis Report (FSAR) or its equivalent, the plan must include: a site characterization, description of the remaining dismantling activities, plans for site remediation, procedures for the final radiation survey, designation of the end use of the site, an updated cost estimate to complete the decommissioning, and any associated environmental concerns. The NRC will notice the receipt of the plan, make the plan available for public comment, and schedule a local meeting. LTP approval will be subject to any conditions and limitations as deemed appropriate by the Commission. The licensee may then commence with the final remediation of site facilities and services, including:

- Removal of remaining plant systems and associated components as they become nonessential to the decommissioning program or worker health and safety (e.g., waste collection and treatment systems, electrical power and ventilation systems).
- Removal of the steel liners from the refueling canal, disposing of the activated and contaminated sections as radioactive waste. Removal of any activated/contaminated concrete.
- Surveys of the decontaminated areas of the containment structure.
- Removal of the contaminated equipment and material from the auxiliary building and any other contaminated facility. Use radiation

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and contamination control techniques until radiation surveys indicate that the structures can be released for unrestricted access and conventional demolition. This activity may necessitate the dismantling and disposition of most of the systems and components (both clean and contaminated) located within these buildings. This activity will facilitate surface decontamination and subsequent verification surveys required prior to obtaining release for demolition.

- Removal of the remaining components, equipment, and plant services in support of the area release survey(s).
- Routing of material removed in the decontamination and dismantling to a central processing area. Material certified to be free of contamination is released for unrestricted disposition, e.g., as scrap, recycle, or general disposal. Contaminated material is characterized and segregated for additional off-site processing (disassembly, chemical cleaning, volume reduction, and waste treatment), and/or packaged for controlled disposal at a low-level radioactive waste disposal facility.

Incorporated into the LTP is the Final Survey Plan. This plan identifies the radiological surveys to be performed once the decontamination activities are completed and is developed using the guidance provided in the “Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM).”^[26] This document incorporates the statistical approaches to survey design and data interpretation used by the EPA. It also identifies commercially available instrumentation and procedures for conducting radiological surveys. Use of this guidance ensures that the surveys are conducted in a manner that provides a high degree of confidence that applicable NRC criteria are satisfied. Once the survey is complete, the results are provided to the NRC in a format that can be verified. The NRC then reviews and evaluates the information, performs an independent confirmation of radiological site conditions, and makes a determination on the requested change to the operating licenses (that would release the property, exclusive of the ISFSI, for unrestricted use).

The NRC will amend the operating licenses to reduce the licensed area to the ISFSI area if it determines that site remediation has been performed in accordance with the LTP, and that the terminal radiation survey and associated documentation demonstrate that the property (exclusive of the ISFSI) is suitable for release.

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2.1.3 Period 3 - Site Restoration

Following completion of decommissioning operations, site restoration activities will begin. Efficient removal of the contaminated materials and verification that residual radionuclide concentrations are below the NRC limits will result in substantial damage to many of the structures. Although performed in a controlled and safe manner, blasting, coring, drilling, scarification (surface removal), and the other decontamination activities will substantially degrade power block structures including the reactor and auxiliary buildings. Under certain circumstances, verifying that subsurface radionuclide concentrations meet NRC site release requirements will require removal of grade slabs and lower floors, potentially weakening footings and structural supports. This removal activity will be necessary for those facilities and plant areas where historical records, when available, indicate the potential for radionuclides having been present in the soil, where system failures have been recorded, or where it is required to confirm that subsurface process and drain lines were not breached over the operating life of the station.

Dismantling of site structures following decommissioning is clearly the most appropriate and cost-effective option. It is unreasonable to anticipate that these structures would be repaired and preserved after the radiological contamination is removed. The effort to dismantle site structures with a work force already mobilized on site is more efficient than if the process were deferred. Site facilities quickly degrade without maintenance, adding additional expense and creating potential hazards to the public as well as to future workers. Abandonment creates a breeding ground for vermin infestation as well as other biological hazards.

This cost study presumes that non-essential structures and site facilities are dismantled as a continuation of the decommissioning activity. Foundations and exterior walls are completely removed, including foundations and basemats as required by Minnesota regulations. [27] Site areas affected by the dismantling activities are restored and the plant area graded as required to prevent ponding, establish erosion control by the planting of native vegetation, and inhibit the refloating of subsurface materials.

Non-contaminated concrete rubble produced by demolition activities is processed to remove reinforcing steel and miscellaneous embedments. All non-contaminated materials are trucked to an off-site area for

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disposal as construction debris. Subgrade voids are backfilled with clean construction fill, suitable under Minnesota regulations.

2.1.4 ISFSI Operations and Decommissioning

The ISFSI will continue to operate under a site-specific license as authorized by 10 CFR Part 72 following the amendment of the operating license to release the adjacent (power block) property. Assuming that Prairie Island spent fuel shipments begin in 2037, the process is not expected to be completed until 2074 (Scenario 1). Any delay in the transfer process, for example, due to a delay in the scheduled opening of the geologic repository, a slower acceptance rate, or a combination of both, can result in a longer on-site residence time for the fuel discharge from the reactor, as well as additional caretaking expenses. Scenarios 3 and 4 address extended delay periods, which includes the assumption that the spent fuel DSCs will need to be replaced every fifty years.

The assumed design for the ISFSI is based upon the use of the existing TN-40 casks from Transnuclear, plus the use of a multi-purpose dry shielded storage canister and a NUHOMS horizontal storage module for pad storage for those fuel assemblies packaged after plant shutdown.

At the conclusion of the spent fuel transfer process, the ISFSI will be decommissioned. The Commission will terminate the license if it determines that the remediation of the ISFSI has been performed in accordance with an ISFSI license termination plan and that the final radiation survey and associated documentation demonstrate that the facility is suitable for release. Once the requirements are satisfied, the NRC can terminate the license for the ISFSI.

For purposes of this cost analysis, it is assumed that once the TN-40s and DSCs containing the spent fuel assemblies have been removed, any required decontamination is performed on the storage overpacks (some minor neutron-induced activation is assumed), and the license for the facility terminated, the concrete overpacks can be dismantled using conventional techniques for the demolition of reinforced concrete. The concrete storage pad is then removed and the area regraded. This topic is discussed in greater detail in section 3.4.1.

2.2 SAFSTOR

The NRC defines SAFSTOR as "the alternative in which the nuclear facility is placed and maintained in a condition that allows the nuclear facility to be

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safely stored and subsequently decontaminated (deferred decontamination) to levels that permit release for unrestricted use." The facility is left intact (during the dormancy period), with structures maintained in a sound condition. Systems not required to operate in support of the spent fuel pool or site surveillance and security are drained, de-energized, and secured. Minimal cleaning/removal of loose contamination and/or fixation and sealing of remaining contamination are performed. Access to contaminated areas is secured to provide controlled access for inspection and maintenance.

The engineering and planning requirements are similar to those for the DECON alternative. Site preparations are also similar to those for the DECON alternative. However, with the exception of the required radiation surveys and site characterizations, the mobilization and preparation of site facilities is less extensive.

2.2.1 Period 1 - Preparations

Preparations for long-term storage include the planning for permanent defueling of the reactors, revision of technical specifications appropriate to the operating conditions and requirements, a characterization of the facility and major components, and the development of the PSDAR.

The process of placing the plant in safe-storage includes, but is not limited to, the following activities:

- Isolation of the spent fuel storage services and fuel handling systems located in the auxiliary building so that safe-storage operations may commence on the balance of the plant. This activity may be carried out by plant personnel in accordance with existing operating technical specifications. Activities are scheduled around the fuel handling systems to the greatest extent possible.
- Draining and de-energizing of the non-contaminated systems not required to support continued site operations or maintenance.
- Disposing of contaminated filter elements and resin beds not required for processing wastes from layup activities for future operations.
- Draining of the reactor vessels, with the internals left in place and the vessel heads secured.
- Draining and de-energizing non-essential, contaminated systems with decontamination as required for future maintenance and inspection.

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- Preparing lighting and alarm systems whose continued use is required; de-energizing portions of fire protection, electric power, and HVAC systems whose continued use is not required.
- Cleaning of the loose surface contamination from building access pathways.
- Performing an interim radiation survey of plant, posting warning signs where appropriate.
- Erecting physical barriers and/or securing all access to radioactive or contaminated areas, except as required for inspection and maintenance.
- Installing security and surveillance monitoring equipment and relocating security fence around secured structures, as required.

2.2.2 Period 2 - Dormancy

The second phase identified by the NRC in its rule addresses licensed activities during a storage period and is applicable to the dormancy phases of the deferred decommissioning alternatives. Dormancy activities include a 24-hour security force, preventive and corrective maintenance on security systems, area lighting, general building maintenance, heating and ventilation of buildings, routine radiological inspections of contaminated structures, maintenance of structural integrity, and a site environmental and radiation monitoring program. Resident maintenance personnel perform equipment maintenance, inspection activities, routine services to maintain safe conditions, adequate lighting, heating, and ventilation, and periodic preventive maintenance on essential site services.

An environmental surveillance program is carried out during the dormancy period to ensure that releases of radioactive material to the environment are prevented and/or detected and controlled. Appropriate emergency procedures are established and initiated for potential releases that exceed prescribed limits. The environmental surveillance program constitutes an abbreviated version of the program in effect during normal plant operations.

Security during the dormancy period is conducted primarily to protect the spent nuclear fuel while it is on site, prevent unauthorized entry, and to protect the public from the consequences of their own actions. The security fence, sensors, alarms, and other surveillance equipment provide security. Fire and radiation alarms are also monitored and

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maintained. While remote surveillance is an option, it does not offer the immediate response time of a physical presence.

The length of the dormancy period is such that decommissioning (license termination) of the station (excluding the ISFSI) is accomplished within 60 years of final shutdown. During Scenario 5, the transfer of the spent fuel to a DOE facility continues during this period until complete. The Scenario 6 SAFSTOR has the site remain in dormancy following spent fuel removal to the maximum extent possible, such that the licenses are terminated within the required 60-year time period. Scenarios 7 and 8 address extended delay periods, which include the assumption that the spent fuel DSCs will need to be replaced every fifty years.

It is required that the licensee submit an application to terminate each license, along with a LTP (described in Section 2.1.2), thereby initiating delayed decommissioning.

2.2.3 Periods 3 and 4 - Delayed Decommissioning

With the beginning of the third phase, prior to the commencement of decommissioning operations, preparations are undertaken to reactivate site services and prepare for decommissioning. Preparations include engineering and planning, a detailed site characterization, and the assembly of a decommissioning management organization. Final planning for activities and the writing of activity specifications and detailed procedures are also initiated at this time.

Much of the work in developing a termination plan is relevant to the development of the detailed engineering plans and procedures. The activities associated with this phase and the follow-on decontamination and dismantling processes are detailed in Sections 2.1.1 and 2.1.2. The primary difference between the sequences anticipated for the DECON and SAFSTOR scenarios is the absence, in the latter, of any constraint on the availability of the fuel storage pool located within the auxiliary building for decommissioning.

Variations in the length of the dormancy period are expected to have some effect upon the quantities of radioactive wastes generated from system and structure removal operations. However, given the levels of radioactivity and spectrum of radionuclides expected from approximately sixty years of plant operation, no plant process system identified as being contaminated upon final shutdown will become releasable due to the decay period alone. (i.e., there is no significant

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reduction in the waste generated from the decommissioning activities). Due to the lower activity levels, a greater percentage of the waste volume can be designated for off-site processing and recovery.

The delay in decommissioning also yields lower working area radiation levels. As such, the estimate for the delayed scenarios incorporate reduced ALARA controls for the SAFSTOR's lower occupational exposure potential.

Although the initial radiation levels due to ^{60}Co will substantially decrease during the dormancy period, the internal components of the reactor vessels will still exhibit sufficiently high radiation dose rates to require remote sectioning under water due to the presence of long-lived radionuclides such as ^{94}Nb , ^{59}Ni , and ^{63}Ni . Therefore, the dismantling procedures described for the DECON alternative would still be employed during this scenario. Portions of the biological shield wall will still be radioactive due to the presence of activated trace elements with long half-lives (^{152}Eu and ^{154}Eu). Decontamination will require controlled removal and disposal. It is assumed that radioactive corrosion products on inner surfaces of piping and components will not have decayed to levels that will permit unrestricted use or allow conventional removal. These systems and components will be surveyed as they are removed and disposed of in accordance with the existing radioactive release criteria.

2.2.4 Period 5 - Site Restoration

Following completion of decommissioning operations, site-restoration activities can begin. Dismantling, as a continuation of the decommissioning process, is a cost-effective option, as described in Section 2.1.3. The basis for the dismantling cost in this scenario is consistent with that described for DECON, presuming the removal of structures and site facilities to include the existing foundations and basemats, and the limited restoration of the site.

2.2.5 ISFSI Operations and Decommissioning

For Scenarios 7 and 8, the ISFSI will continue to operate under a site-specific license as authorized by 10 CFR Part 72 following the amendment of the operating license to release the adjacent (power block) property. Assuming that Prairie Island spent fuel shipments begin in 2093, the process is not expected to be completed until 2117 (Scenario 7). Assuming that Prairie Island spent fuel shipments begin in 2193, the process is not expected to be completed until 2217 (Scenario 8). Any

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delay in the transfer process, for example, due to a delay in the scheduled opening of the geologic repository, a slower acceptance rate, or a combination of both, can result in a longer on-site residence time for the fuel, as well as additional caretaking expenses. ISFSI operations will include the assumption that the spent fuel DSCs will need to be replaced every fifty years.

Operations and decommissioning activities for Scenarios 7 and 8 during a SAFSTOR scenario proceed in a similar fashion to the Scenario 3 and 4 following DECON, as discussed in Section 2.1.4.

3. COST ESTIMATES

The cost estimates prepared for decommissioning Prairie Island consider the unique features of the site, including the NSSS, power generation systems, support services, site buildings, and ancillary facilities. The basis of the estimates, including the sources of information relied upon, the estimating methodology employed, site-specific considerations, and other pertinent assumptions, is described in this section.

3.1 BASIS OF ESTIMATES

The estimates were developed using the site-specific, technical information from the 2017 analysis. The plant inventory, the basis for the decontamination and dismantling requirements and cost, and the decommissioning waste streams, was reviewed for this analysis; no substantive changes were identified over the three-year period (between estimates) to the configuration of the plant or site facilities that would impact decommissioning. The site-specific considerations and assumptions used in the previous evaluation were also revisited; no necessary modifications were identified.

3.2 METHODOLOGY

The methodology used to develop the estimates follows the basic approach originally presented in the AIF/NESP-036 study report, "Guidelines for Producing Commercial Nuclear Power Plant Decommissioning Cost Estimates,"^[28] and the DOE "Decommissioning Handbook."^[29] These documents present a unit factor method for estimating decommissioning activity costs, which simplifies the estimating calculations. Unit factors for concrete removal (\$/cubic yard), steel removal (\$/ton), and cutting costs (\$/inch) were developed using local labor rates. The activity-dependent costs were estimated with the item quantities (cubic yards and tons), developed from plant drawings and inventory documents. Removal rates and material costs for the conventional disposition of components and structures relied upon information available in the industry publication, "Building Construction Cost Data," published by RSMeans.^[30]

The unit factor method provides a demonstrable basis for establishing reliable cost estimates. The detail provided in the unit factors, including activity duration, labor costs (by craft), and equipment and consumable costs, ensures that essential elements have not been omitted. Appendix A presents the detailed development of a typical unit factor. Appendix B provides the values contained within one set of factors developed for this analysis.

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Regulatory Guide 1.184 ^[31] describes the methods and procedures that are acceptable to the NRC staff for implementing the requirements that relate to the initial activities and the major phases of the decommissioning process. The costs and schedules presented in this analysis follow the general guidance and sequence in the regulations. The format and content of the estimates is also consistent with the recommendations of Regulatory Guide 1.202. ^[32]

The estimates also reflect lessons learned from TLG's involvement in the Shippingport Station Decommissioning Project, completed in 1989, as well as the decommissioning of the Cintichem reactor, hot cells and associated facilities, completed in 1997. In addition, the planning and engineering for the Rancho Seco, Trojan, Yankee Rowe, Big Rock Point, Maine Yankee, Humboldt Bay-3, Oyster Creek, Connecticut Yankee, Crystal River, Vermont Yankee, Fort Calhoun, Pilgrim, and Indian Point nuclear units have provided additional insight into the process, the regulatory aspects, and the technical challenges of decommissioning commercial nuclear units.

Work Difficulty Factors

The estimates follow the principles of ALARA through the use of work duration adjustment factors. These factors address the impact of activities such as radiological protection instruction, mock-up training, and the use of respiratory protection and protective clothing. The factors lengthen a task's duration, increasing costs and lengthening the overall schedule. ALARA planning is considered in the costs for engineering and planning, and in the development of activity specifications and detailed procedures. Changes to worker exposure limits may impact the decommissioning cost and project schedule.

Work difficulty adjustment factors (WDFs) account for the inefficiencies in working in a power plant environment. The factors are assigned to each unique set of unit cost factors, commensurate with the inefficiencies associated with working in confined, hazardous environments. The ranges used for the WDFs are as follows:

- | | |
|---------------------------------|------------|
| • Access Factor | 10% to 20% |
| • Respiratory Protection Factor | 10% to 50% |
| • Radiation/ALARA Factor | 10% to 40% |
| • Protective Clothing Factor | 10% to 30% |
| • Work Break Factor | 8.33% |

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The factors and their associated range of values were developed in conjunction with the AIF/NESP-036 study. The application of the factors is discussed in more detail in that publication.

Scheduling Program Durations

The unit factors, adjusted by the WDFs as described above, are applied against the inventory of materials to be removed in the radiologically controlled areas. The resulting man-hours, or crew-hours, are used in the development of the decommissioning program schedule, using resource loading and event sequencing considerations. The scheduling of conventional removal and dismantling activities are based upon productivity information available from the RSMeans "Building Construction Cost Data" publication. Dismantling of the fuel handling systems and decontamination of the spent fuel pool is also dependent upon the timetable for the transfer of the spent fuel assemblies from the pool to the ISFSI.

The program schedule is used to determine the period-dependent costs for program management, administration, field engineering, equipment rental, contracted services, etc. The study relies upon regional or site-specific salary and wage rates for the personnel associated with the intended program.

3.3 IMPACT OF DECOMMISSIONING MULTIPLE REACTOR UNITS

In estimating the near simultaneous decommissioning of two co-located reactor units there can be opportunities to achieve economies of scale, by sharing costs between units, and coordinating the sequence of work activities. There will also be schedule constraints, particularly where there are requirements for specialty equipment and staff, or practical limitations on when final status surveys can take place. For purposes of the estimates, Units 1 and 2 are assumed to be essentially identical. Common facilities have been assigned to Unit 2. A summary of the principal impacts is listed below.

- The sequence of work generally follows the principal that the work is done at Unit 1 first, followed by similar work at Unit 2. This permits the experience gained at Unit 1 to be applied by the workforce at the second unit. It should be noted however, that the estimates do not consider productivity improvements at the second unit, since there is little documented experience with decommissioning two units simultaneously. The work associated with developing activity specifications and procedures can be considered essentially identical between the two units, therefore the second unit costs are assumed to be a fraction of the first unit (~ 43%).

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- Segmenting the reactor vessel and internals will require the use of special equipment. The cost of procuring that equipment is assumed to be shared on an equal basis between the two units. In addition, the decommissioning project will be scheduled such that Unit 2's reactor internals and vessel are segmented immediately after the activities at Unit 1 have been completed.
- Duplication of some program management and support costs, particularly costs associated with the more senior positions, can be avoided with two reactors undergoing decommissioning simultaneously. As a result, the estimates are based on a "lead" unit that includes these senior positions, and a "second" unit that excludes these positions. The designation as lead is based on the unit undertaking the most complex tasks (for instance vessel segmentation) or performing tasks for the first time.
- The final radiological survey schedule is also affected by a two-unit decommissioning schedule. Trying to complete the final status survey of Unit 1, while Unit 2 still has ongoing radiological remediation work and waste handling in process is considered impractical. As a result, Unit 1 and Unit 2 delay durations awaiting spent fuel pool availability for decommissioning are synchronized, such that the spent fuel pool area decommissioning and subsequent final status survey can be completed for the station. During the spent fuel storage period, program management costs are reduced accordingly.
- The final demolition of buildings at Units 1 and 2 are considered to take place concurrently.
- Unit 1, as the first unit to enter decommissioning, incurs the majority of site characterization costs.
- Shared systems and structures are generally assigned to Unit 2.
- Station costs such as ISFSI operations, emergency response fees, regulatory agency fees, and insurance are generally allocated on an equal basis between the two units.

3.4 FINANCIAL COMPONENTS OF THE COST MODEL

TLG's proprietary decommissioning cost model, DECCER, produces a number of distinct cost elements. These direct expenditures, however, do not comprise the total cost to accomplish the project goal, i.e., license termination and site restoration.

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3.4.1 Contingency

Inherent in any cost estimate that does not rely on historical data is the inability to specify the precise source of costs imposed by factors such as tool breakage, accidents, illnesses, weather delays, and labor stoppages. In the DECCER cost model, contingency fulfills this role. Contingency is added to each line item to account for costs that are difficult or impossible to develop analytically. Such costs are historically inevitable over the duration of a job of this magnitude; therefore, this cost analysis includes funds to cover these types of expenses.

The activity- and period-dependent costs are combined to develop the total decommissioning cost. A contingency is then applied on a line-item basis, using one or more of the contingency types listed in the AIF/NESP-036 study. "Contingencies" are defined in the American Association of Cost Engineers "Project and Cost Engineers' Handbook"^[33] as "specific provision for unforeseeable elements of cost within the defined project scope; particularly important where previous experience relating estimates and actual costs has shown that unforeseeable events which will increase costs are likely to occur." The cost elements in this analysis are based upon ideal conditions and maximum efficiency; therefore, consistent with industry practice, a contingency factor has been applied. In the AIF/NESP-036 study, the types of unforeseeable events that are likely to occur in decommissioning are discussed and guidelines are provided for percentage contingency in each category. It should be noted that contingency, as used in this analysis, does not account for price escalation and inflation in the cost of decommissioning over the remaining operating life of the station.

The use and role of contingency within decommissioning estimates is not a "safety factor issue." Safety factors provide additional security and address situations that may never occur. Contingency funds are expected to be fully expended throughout the program. They also provide assurance that sufficient funding is available to accomplish the intended tasks. An estimate without contingency, or from which contingency has been removed, can disrupt the orderly progression of events and jeopardize a successful conclusion to the decommissioning process.

For example, the most technologically challenging task in decommissioning a commercial nuclear plant is the disposition of the reactor vessels and internal components, now highly radioactive after a lifetime of exposure to core activity. The disposition of these components

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forms the basis of the critical path (schedule) for decommissioning operations. Cost and schedule are interdependent, and any deviation in schedule has a significant impact on cost for performing a specific activity.

Disposition of the reactor vessel internals involves the underwater cutting of complex components that are highly radioactive. Costs are based upon optimum segmentation, handling, and packaging scenarios. The schedule is primarily dependent upon the turnaround time for the heavily shielded shipping casks, including preparation, loading, and decontamination of the containers for transport. The number of casks required is a function of the pieces generated in the segmentation activity, a value calculated on optimum performance of the tooling employed in cutting the various subassemblies. The expected optimization, however, may not be achieved, resulting in delays and additional program costs. For this reason, contingency must be included to mitigate the consequences of the expected inefficiencies inherent in this complex activity, along with related concerns associated with the operation of highly specialized tooling, field conditions, and water clarity.

Contingency funds are an integral part of the total cost to complete the decommissioning process. Exclusion of this component puts at risk a successful completion of the intended tasks and, potentially, subsequent related activities. For this study, TLG examined the major activity-related problems (decontamination, segmentation, equipment handling, packaging, transport, and waste disposal) that necessitate a contingency. Individual activity contingencies ranged from 10% to 75%, depending on the degree of difficulty judged to be appropriate from TLG's actual decommissioning experience. The contingency values used in this study are as follows:

| | |
|--|-----|
| Decontamination | 50% |
| Contaminated Component Removal | 25% |
| Contaminated Component Packaging | 10% |
| Contaminated Component Transport | 15% |
| Low-Level Radioactive Waste Disposal | 25% |
| Low-Level Radioactive Waste Processing | 15% |
| Reactor Segmentation | 75% |
| NSSS Component Removal | 25% |
| Reactor Waste Packaging | 25% |
| Reactor Waste Transport | 25% |

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| | |
|--|-----|
| Reactor Vessel Component Disposal | 50% |
| GTCC Disposal | 15% |
| Staffing | 15% |
| Spent Fuel Management | 15% |
| Non-Radioactive Component Removal | 15% |
| Heavy Equipment and Tooling | 15% |
| Supplies | 25% |
| Engineering | 15% |
| Energy | 15% |
| Insurance and Fees | 10% |
| Characterization and Termination Surveys | 30% |
| Operations and Maintenance Expense | 15% |
| Construction | 15% |
| Property Taxes | 10% |
| ISFSI Decommissioning | 25% |

The contingency values are applied to the appropriate components of the estimates on a line item basis. A composite value is then reported at the end of each detailed estimate (as provided in Appendices C through J). Appendix K, the ISFSI decommissioning calculation, uses a flat 25% contingency added at the end of the calculation.

3.4.2 Financial Risk

In addition to the routine uncertainties addressed by contingency, another cost element that is sometimes necessary to consider when bounding decommissioning costs relates to uncertainty, or risk. Examples can include changes in work scope, pricing, job performance, and other variations that could conceivably, but not necessarily, occur. Consideration is sometimes necessary to generate a level of confidence in the estimate, within a range of probabilities. TLG considers these types of costs under the broad term “financial risk.” Included within the category of financial risk are:

- Transition activities and costs: ancillary expenses associated with eliminating 50% to 80% of the site labor force shortly after the cessation of plant operations, added cost for worker separation packages throughout the decommissioning program, national or company-mandated retraining, and retention incentives for key personnel.

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- Delays in approval of the decommissioning plan due to intervention, public participation in local community meetings, legal challenges, and national and local hearings.
- Changes in the project work scope from the baseline estimate, involving the discovery of unexpected levels of contaminants, contamination in places not previously expected, contaminated soil previously undiscovered (either radioactive or hazardous material contamination), variations in plant inventory or configuration not indicated by the as-built drawings.
- Regulatory changes (e.g., affecting worker health and safety, site release criteria, waste transportation, and disposal).
- Policy decisions altering national commitments (e.g., in the ability to accommodate certain waste forms for disposition) or in the timetable for such, for example, the start and rate of acceptance of spent fuel by the DOE.
- Pricing changes for basic inputs such as labor, energy, materials, and disposal. Items subject to widespread price competition (such as materials) may not show significant variation; however, others such as waste disposal could exhibit large pricing uncertainties, particularly in markets where limited access to services is available.

This cost study does not add any additional costs to the estimate for financial risk, since there is insufficient historical data from which to project future liabilities. Consequently, the areas of uncertainty or risk are revisited periodically and addressed through repeated revisions or updates of the base estimates.

3.5 SITE-SPECIFIC CONSIDERATIONS

There are a number of site-specific considerations that affect the method for dismantling and removal of equipment from the site and the degree of restoration required. The cost impacts of the considerations identified below are included in this cost study.

3.5.1 Spent Fuel Management

The cost to dispose of spent fuel generated from plant operations is not reflected within the estimates to decommission Prairie Island. Ultimate disposition of the spent fuel is within the province of the DOE's Waste Management System, as defined by the Nuclear Waste Policy Act. As such, the disposal cost was financed by a 1 mill/kWhr surcharge paid

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into the DOE's waste fund during operations. On November 19, 2013, the U.S. Court of Appeals for the D.C. Circuit ordered the Secretary of the Department of Energy to suspend collecting annual fees for nuclear waste disposal from nuclear power plant operators until the DOE has conducted a legally adequate fee assessment.

The NRC does, however, require licensees to establish a program to manage and provide funding for the management of all irradiated fuel at the reactor site until title of the fuel is transferred to the Secretary of Energy. This requirement is prepared for through inclusion of certain high-level waste cost elements within the estimates, as described below.

Xcel Energy's current spent fuel management plan for the Prairie Island spent fuel is based in general upon:

- 1) Fuel transferred from the pool to the ISFSI within 4 years of shutdown;
- 2) Exchange of Prairie Island and Monticello spent fuel acceptance rights to best manage the overall cost of spent fuel storage for both plants;
- 3) Fuel will be shipped in the existing Transnuclear TN-40 casks, plus NUHOMS DSCs for fuel removed after final plant shutdown (Scenarios 1, 2, 5, and 6); the canisters and NUHOMS are periodically replaced in Scenarios 3, 4, 7 and 8. Spent fuel assemblies from TN-40 casks that are replaced will be put into NUHOMS DSCs. Canisters that are unloaded in the spent fuel transfer operation will be surveyed for neutron activation.
- 4) As an allowance, some of these canisters and NUHOMS modules from the first off-load operation are assumed to be mildly neutron activated and therefore must be disposed of as radioactive waste.
- 5) For the 100 and 200 year dry fuel storage scenarios (Scenarios 3, 4, 7 and 8) the canisters and casks will be replaced on a 50 year schedule using a dry transfer facility.

This analysis assumes that the existing ISFSI is modified at the cessation of plant operations to accommodate the fuel present in the storage pool at shutdown.

The DOE's repository program assumes that spent fuel will be accepted for disposal from the nation's commercial nuclear plants in the order (the "queue") in which it was removed from service ("oldest fuel first").^[34] Repository operations were based upon annual industry-wide receipt of

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400 Metric Tons Heavy Metal (MTHM) in the first year of operation, a total of 3,800 MTHM in years 2 through 4 and 3,000 MTHM for year 5 and beyond.^[35] This logic supports the spent fuel schedules for Scenarios 1 and 5. All other spent fuel scenarios are consistent with those identified by the Minnesota PSC.

Operation and maintenance costs for the spent fuel pool and ISFSI are included within the estimates and address the costs for staffing the facility, as well as security, insurance, and licensing fees. The estimates also include the costs to purchase, load, and transfer the NUHOMS DSCs from the pool to the ISFSI. Costs are also provided for the final disposition of the ISFSI once the transfer of the TN-40s and DSCs from the ISFSI to the DOE is complete.

Storage Canister Design

The design and capacity of the ISFSI is based upon the Monticello Transnuclear NUHOMS system (with a 61-fuel assembly capacity). The system consists of a multi-purpose (storage and transport) dry shielded storage canister (DSC) and a horizontal storage module (HSM). The PWR equivalent for a NUHOMS system of 32 assemblies is assumed for this estimate. The existing TN-40 casks will remain in the ISFSI until they are either shipped to the DOE, or emptied and disposed of during recasking.

Canister Loading and Transfer

The estimates include an average cost of \$626,000 for the labor to load/transport the spent fuel from the pool to the ISFSI pad. For estimating purposes an allowance of \$361,000 is used for the cost to transfer each fuel canister from the ISFSI pad to the DOE transport vehicle.

Operations and Maintenance

An annual cost (excluding labor) of approximately \$845,000 and \$112,000 are used for operation and maintenance of the spent fuel pool and the ISFSI, respectively.

At shutdown, the spent fuel pool is expected to contain freshly discharged assemblies (from the most recent refueling cycles). Over the next four years the assemblies are packaged into DSCs for transfer to the ISFSI for transfer to the DOE. It is assumed that the four years

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provides the necessary cooling period for the final cores to meet the decay heat requirements for dry storage. Once the pool is emptied, the spent fuel storage and handling facilities are available for decommissioning.

Replacement of DSCs during ISFSI fuel storage period

Scenarios 1, 2, 5, and 6 do not assume any replacement of the spent fuel storage DSCs (recasking).

The other four cost estimates, Scenarios 3, 4, 7 and 8, include costs to recask the spent fuel, based upon an assumption that the DSC has a limited lifetime of approximately 50 years.

Scenarios 3 and 7, which are 100 years (nominally) in length, considers two repackaging efforts for each DSC in the ISFSI.

Scenario 4 and 8, which are a (nominal) 200-year scenario, assumes that when any DSC in the ISFSI reaches the 50 years of storage milestone, the DSC is replaced. The fuel will be recasked four times following final shutdown of Prairie Island.

Since the auxiliary building, spent fuel storage pool, and fuel handling facilities are removed by the year 2037, a dry fuel transfer facility is assumed to be constructed on site to perform the transfers from the old to the new DSCs. Scenarios 3, 4, 7 and 8 include the cost to construct such a transfer facility, as well as additional staffing positions for support of the dry transfer activities, and additional NRC oversight associated with the transfer operations. The decommissioning of this transfer facility is also included in these scenarios.

ISFSI Decommissioning

In accordance with 10 CFR §72.30, licensees must have a proposed decommissioning plan for the ISFSI site and facilities that includes a cost estimate for the plan. The plan should contain sufficient information on the proposed practices and procedures for the decontamination of the ISFSI and for the disposal of residual radioactive materials after all spent fuel, high-level radioactive waste, and reactor-related GTCC waste have been removed.

The NUHOMS multi-purpose dry shielded storage canister with a horizontal, reinforced concrete storage module is used as a basis for the

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ISFSI decommissioning cost analyses. The modules are assumed to have some level of neutron-induced activation, as a result of the long-term storage of the fuel, i.e., to levels exceeding free-release limits. As an allowance, 8 modules are assumed to require remediation, equivalent to the number of modules required to accommodate the final core offloads at Prairie Island (121 assemblies per unit). The cost of the disposition of this material, as well as the demolition of the ISFSI facility, is included in the estimates.

The existing ISFSI pad, supporting the TN-40 casks, is not expected to be contaminated and will be demolished accordingly after a confirmation survey.

In accordance with the specific requirements of 10 CFR §72.30 for the ISFSI work scope, the cost estimate for decommissioning the ISFSI reflects: 1) the cost of an independent contractor performing the decommissioning activities; 2) an adequate contingency factor; and 3) the cost of meeting the criteria for unrestricted use. The cost summary for decommissioning the ISFSI is presented in Appendix K. It contains four different scenarios reflecting the different number of casks present at the end of the ISFSI operations. The demolition of the ISFSI for all eight scenarios is reflected within the estimates.

GTCC

The dismantling of the reactor internals is expected to generate radioactive waste considered unsuitable for shallow land disposal (i.e., low-level radioactive waste with concentrations of radionuclides that exceed the limits established by the NRC for Class C radioactive waste (GTCC)). The Low-Level Radioactive Waste Policy Amendments Act of 1985 assigned the federal government the responsibility for the disposal of this material. The Act also stated that the beneficiaries of the activities resulting in the generation of such radioactive waste bear all reasonable costs of disposing of such waste. ^[36]

Although the material is not classified as high-level waste, federal regulations under the Act designate that disposal of this material is a federal responsibility under Section 3(b)(1)(D). However, the DOE has not been forthcoming with an acceptance criteria or disposition schedule for this material, and numerous questions remain as to the ultimate disposal cost and waste form requirements.

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As such, for purposes of this study, the GTCC has been packaged and disposed of in the same manner as high-level waste, at a cost equivalent to that envisioned for the spent fuel. The number of DSCs required and the packaged volume for GTCC was based upon experience at Maine Yankee (e.g., the constraints on loading as identified in the canister's certificate of compliance), but adjusted for the increased spent fuel capacity of the current DSCs.

It is assumed that the DOE would not accept this waste prior to completing the transfer of spent fuel. Therefore, until such time the DOE is ready to accept GTCC waste, it is reasonable to assume that this material would remain in storage at Prairie Island (for the four DECON scenarios (1 through 4) and the SAFSTOR scenarios 7 and 8, alternatives). In SAFSTOR scenarios 5 and 6, the GTCC material is shipped directly to a DOE facility as it is generated since the fuel will have been removed from the site prior to the completion of delayed dismantling. GTCC costs have been segregated and included within the "License Termination" expenditures.

3.5.2 Reactor Vessel and Internal Components

The reactor pressure vessel and internal components are segmented for disposal in shielded, reusable transportation casks. Segmentation is performed underwater in the refueling canal, where a turntable and remote cutter are installed. The vessels are segmented in place, using a mast-mounted cutter supported off the lower head and directed from a shielded work platform installed overhead in the reactor cavity. Transportation cask specifications and transportation regulations dictate the segmentation and packaging methodology. The control elements are disposed of along with the spent fuel; there is no additional cost provided for their disposal.

Intact disposal of reactor vessel shells has been successfully demonstrated at several of the sites that have been decommissioned. Access to navigable waterways has allowed these large packages to be transported to the Barnwell disposal site with minimal overland travel. Intact disposal of the reactor vessel and internal components can provide savings in cost and worker exposure by eliminating the complex segmentation requirements, isolation of the GTCC material, and transport/storage of the resulting waste packages. Portland General Electric (PGE) was able to dispose of the Trojan reactor as an intact package (including the internals). However, its location on the Columbia River simplified the transportation analysis since:

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- the reactor package could be secured to the transport vehicle for the entire journey, i.e., the package was not lifted during transport,
- there were no man-made or natural terrain features between the plant site and the disposal location that could produce a large drop, and
- transport speeds were very low, limited by the overland transport vehicle and the river barge.

As a member of the Northwest Compact, PGE had a site available for disposal of the package - the US Ecology facility in Washington State. The characteristics of this arid site proved favorable in demonstrating compliance with land disposal regulations.

It is not known whether this option will be available when Prairie Island ceases operation. Future viability of this option will depend upon the ultimate location of the disposal site, as well as the disposal site licensee's ability to accept highly radioactive packages and effectively isolate them from the environment. As such, the estimates assume segmentation of the reactor vessel, as a bounding condition. With lower levels of activation, the vessel shell can be packaged more efficiently than the curie-limited internal components. This will allow the use of more conventional waste packages rather than shielded casks for transport.

3.5.3 Primary System Components

In the DECON scenarios, the reactor coolant system components are assumed to be decontaminated using chemical agents prior to the start of cutting operations. This type of decontamination can be expected to have a significant ALARA impact in the DECON scenarios, since the removal work is done within the first few years of shutdown. A decontamination factor (average reduction) of 10 is assumed for the process. Disposal of the decontamination solution effluent is included within the estimate as a "process liquid waste" charge. The SAFSTOR scenarios do not include any decontamination of the reactor system; radioactive decay from the delay period in the dormancy results in similar results.

The following discussion deals with the removal and disposition of the steam generators, but the techniques involved are also applicable to other large radioactively-contaminated components, such as heat

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exchangers, component coolers, and the pressurizer. The steam generators' size and weight, their location within the reactor building, as well as the disposal facility waste acceptance criteria, and access to transportation will ultimately determine the removal, transportation, and disposal strategy.

A trolley crane is set up for the removal of the generators. It can also be used to move portions of the steam generator cubicle walls and floor slabs from the reactor building to a location where they can be decontaminated and transported to the material handling area. Interferences within the work area, such as grating, piping, and other components are removed to create sufficient lay-down space for processing these large components.

The generators are rigged for removal, disconnected from the surrounding piping and supports, and maneuvered into the open area where they are lowered onto a down-ending cradle. Each generator is rotated into the horizontal position for extraction from the containment and placed onto a multi-wheeled vehicle for transport to an on-site preparation area.

Disposal costs are based upon the displaced volume and weight of the primary side portions of the steam generators. Each component is then loaded onto a rail car for transport to the disposal facility. The secondary side is assumed to be sent to an off-site waste processor.

Reactor coolant piping is cut from the reactor vessel once the water level in the vessel (used for personnel shielding during dismantling and cutting operations in and around the vessel) is dropped below the nozzle zone. The piping is boxed and transported by shielded van. The reactor coolant pumps and motors are lifted out intact, packaged, and transported for processing and/or disposal.

3.5.4 Main Turbine and Condenser

The main turbine and condenser are assumed to have only minor levels of contamination. As such, the components are dismantled using conventional maintenance procedures. The turbine rotors and shafts will be removed to a laydown area. The lower turbine casings will be removed from their anchors by controlled demolition. The main condensers will also be disassembled and moved to a laydown area. Material is then prepared for transportation to an off-site recycling facility where it will be surveyed and designated for either

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decontamination or volume reduction, or controlled disposal. Components will be packaged and readied for transport in accordance with the intended disposition.

3.5.5 Transportation Methods

Contaminated piping, components, and structural material other than the highly activated reactor vessels and internal components will qualify as LSA-I, II or III or Surface Contaminated Object, SCO-I or II, as described in Title 49.^[37] The contaminated material will be packaged in Industrial Packages (IP-1, IP-2, or IP-3, as defined in subpart 10 CFR 173.411) for transport unless demonstrated to qualify as their own shipping containers. The reactor vessel and internal components are expected to be transported in accordance with 10 CFR Part 71, as Type B. It is conceivable that the reactor, due to its limited specific activity, could qualify as LSA II or III. However, the high radiation levels on the outer surface would require that additional shielding be incorporated within the packaging so as to attenuate the dose to levels acceptable for transport.

Any fuel cladding failure that occurred during the lifetime of the plant is assumed to have released fission products at sufficiently low levels that the buildup of quantities of long-lived isotopes (e.g., ¹³⁷Cs, ⁹⁰Sr, or transuranics) has been prevented from reaching levels exceeding those that permit the major reactor components to be shipped under current transportation regulations and disposal requirements.

Transport of the highly activated metal, produced in the segmentation of the reactor vessel and internal components, will be by shielded truck cask. Cask shipments may exceed 95,000 pounds, including vessel segment(s), supplementary shielding, cask tie-downs, and tractor-trailer. The maximum level of activity per shipment assumed permissible was based upon the license limits of the available shielded transport casks. The segmentation scheme for the vessel and internal segments is designed to meet these limits.

The transport of large intact components (e.g., large heat exchangers and other oversized components) will be by a combination of truck, rail, and/or multi-wheeled transporter. Transportation costs for Class A radioactive material requiring controlled disposal are based upon the mileage to the EnergySolutions facility in Clive, Utah. Transportation costs for the higher activity Class B and C radioactive material are based upon the mileage to the WCS facility in Andrews County, Texas.

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The transportation cost for the GTCC material is assumed to be contained within the disposal cost. Transportation costs for off-site waste processing are based upon the mileage to Oak Ridge, Tennessee. Truck transport costs were estimated using published tariffs from Tri-State Motor Transit. [38]

3.5.6 Low-Level Radioactive Waste Disposal

To the greatest extent practical, metallic material generated in the decontamination and dismantling processes is processed to reduce the total cost of controlled disposal. Material meeting the regulatory and/or site release criterion, is released as scrap, requiring no further cost consideration. Conditioning (preparing the material to meet the waste acceptance criteria of the disposal site) and recovery of the waste stream is performed off site at a licensed processing center. Any material leaving the site is subject to a survey and release charge, at a minimum.

The mass of radioactive waste generated during the various decommissioning activities at the site is shown on a line-item basis in the detailed Appendices C through J, and summarized in Section 5. The quantified waste summaries shown in these tables are consistent with 10 CFR Part 61 classifications. Commercially available steel containers are presumed to be used for the disposal of piping, small components, and concrete. Larger components can serve as their own containers, with proper closure of all openings, access ways, and penetrations. The volumes are calculated based on the exterior package dimensions for containerized material or a specific calculation for components serving as their own waste containers.

The more highly activated reactor components will be shipped in reusable, shielded truck casks with disposable liners. In calculating disposal costs, the burial fees are applied against the liner volume and weight, with surcharges added for the special handling requirements and the radiological characteristics of the payload. Packaging efficiencies are lower for the highly activated materials (greater than Type A quantity waste), where high concentrations of gamma-emitting radionuclides limit the capacity of the shipping canisters.

The cost to dispose of the lowest level and majority of the material generated from the decontamination and dismantling activities is based upon representative costs for disposal at EnergySolutions facility in Clive, Utah. Disposal costs for the higher activity waste (Class B and C)

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were based upon preliminary and indicative information from WCS for the Andrews County facility.

Material exceeding Class C limits (limited to material closest to the reactor core and comprising less than 1% of the total waste volume) is generally not suitable for shallow-land disposal. This material is packaged in the same multipurpose canisters used for spent fuel storage/transport, for eventual transfer to the DOE for disposal.

3.5.7 Site Conditions Following Decommissioning

The NRC will amend or terminate each unit's license if it determines that site remediation has been performed in accordance with the license termination plan, and that the terminal radiation survey and associated documentation demonstrate that the facility is suitable for release. The NRC's involvement in the decommissioning process will end at this point. Building codes and environmental regulations will dictate the next step in the decommissioning process, as well as Xcel Energy's own future plans for the site, e.g., the electrical switchyard will remain in support of the regional transmission and distribution system.

Asphalt surfaces in the immediate vicinity of site buildings are broken up and the material disposed of as construction debris. The site access road will remain.

Only existing site structures are considered in the dismantling cost. All subgrade structures are removed. The voids are backfilled with clean debris and capped with soil. The site is then re-graded to conform to the adjacent landscape. Vegetation is established to inhibit erosion. These "non-radiological costs" are included in the total cost of decommissioning.

Bulk excavation of soil and material in the immediate vicinity of the power block is included to remove various duct banks, catch basins, and underground utilities that may exist.

The estimates do not assume the remediation of any significant volume of contaminated soil. This assumption may be affected by continued plant operations and/or future regulatory actions, such as the development of site-specific release criteria.

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3.6 ASSUMPTIONS

The following are the major assumptions made in the development of the estimates for decommissioning the site.

3.6.1 Estimating Basis

Decommissioning costs are reported in the year of projected expenditure; however, the values are provided in 2020 dollars. Costs are not inflated, escalated, or discounted over the periods of performance.

The estimates rely upon the physical plant inventory that was the basis for the 2017 analysis (updated to reflect any material changes to the plant over the past three years).

The study follows the principles of ALARA through the use of work duration adjustment factors. These factors address the impact of activities such as radiological protection instruction, mock-up training, and the use of respiratory protection and protective clothing. The factors lengthen a task's duration, increasing costs and lengthening the overall schedule. ALARA planning is considered in the costs for engineering and planning, and in the development of activity specifications and detailed procedures. Changes to worker exposure limits may impact the decommissioning cost and project schedule.

3.6.2 Labor Costs

For purposes of this analysis, it is assumed that Xcel Energy will hire a Decommissioning Operations Contractor (DOC) to manage the decommissioning. Xcel Energy will provide site security, radiological health and safety, quality assurance and overall site administration during the decommissioning and demolition phases. Contract personnel will provide engineering services (e.g., for preparing the activity specifications, work procedures, neutron activation, and structural analyses) under the direction of Xcel Energy.

Utility labor costs were provided by Xcel Energy. Average costs were provided by department or work group and included payroll overheads. Decommissioning Operations Contractor (DOC) labor costs were based on utility labor costs with modified markups to account for employee benefits, DOC overhead and profit.

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The craft labor required to decontaminate and dismantle the nuclear station will be acquired through standard site contracting practices. Craft labor costs were based upon information from Xcel Energy. Craft labor costs include applicable overheads and profit.

Security levels are assumed to be maintained at “operating levels” for approximately 18 months after operations ceases. Additional reductions in force size are assumed when the pool is empty and with the completion of the decommissioning and site restoration activities.

Staffing levels are assigned by sub-period and functional area. Economies of a multi-unit decommissioning are recognized by establishing a primary and a secondary staff level. The unit assigned the primary staff will include common supervisory positions and positions that may be shared across both units. The types of positions and staffing levels are adjusted based upon the type of activity occurring in each sub-period.

Representative profiles of the staffing level for decommissioning, including contractors and craft, is provided in Figures 3.1 and 3.2 for the DECON (Scenario 2) and SAFSTOR (Scenario 6) estimates. Utility staffing levels will gradually decrease after completing the removal of physical systems. Staffing levels and management support will vary based upon the amount and type of decommissioning work. Craft manpower levels decrease after systems removal and structures decontamination and drop substantially during the delay period and the license termination survey period. However, craft levels increase again during the site restoration period due to the work associated with structures demolition. During SAFSTOR dormancy, following transfer of the spent fuel to the ISFSI, staffing levels for the power block are reduced to a minimum, then rise as the delayed dismantling operations begin.

Security, while reduced from operating levels, is maintained throughout the decommissioning for access control, material control, and to safeguard the spent fuel (in accordance with the requirements of 10 CFR Part 37, Part 72, and Part 73). Once the fuel has been transferred to the DOE in scenarios 5 and 6, the security organization will be reduced to Part 37 requirements.

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3.6.3 Design Conditions

Any fuel cladding failure that occurred during the lifetime of the plant is assumed to have released fission products at sufficiently low levels that the buildup of quantities of long-lived isotopes (e.g., ^{137}Cs , ^{90}Sr , or transuranics) has been prevented from reaching levels exceeding those that permit the major NSSS components to be shipped under current transportation regulations and disposal requirements.

The curie contents of the vessels and internals at final shutdown are derived from those listed in NUREG/CR-3474.^[39] Actual estimates are derived from the curie/gram values contained therein and adjusted for the different mass of the Prairie Island components, projected operating life, and different periods of decay. Additional short-lived isotopes were derived from NUREG/CR-0130^[40] and NUREG/CR-0672,^[41] and benchmarked to the long-lived values from NUREG/CR-3474.

It is anticipated that there will be control element assemblies (CEAs) in the spent fuel pool at the cessation of operations, including those CEAs from the final core. This analysis assumes that the CEAs can be disposed of along with the spent fuel at no additional cost (in accordance with Appendix E of the Standard Contract ^[42]).

Neutron activation of the reactor building structure is confined to the reactor biological shield.

3.6.4 General

Transition Activities

Existing warehouses will be cleared of non-essential material and remain for use by Xcel Energy and subcontractors. The plant's operating staff will perform the following activities at no additional cost or credit to the project during the transition period:

- Drain and collect fuel oils, lubricating oils, and transformer oils for recycle and/or sale.
- Drain and collect acids, caustics, and other chemical stores for recycle and/or sale.
- Processes operating waste inventories, i.e., the estimates do not address the disposition of any legacy wastes; the disposal of

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operating wastes during this initial period is not considered a decommissioning expense.

Scrap and Salvage

The existing plant equipment is considered obsolete and suitable for scrap as deadweight quantities only. Xcel Energy will make economically reasonable efforts to salvage equipment following final plant shutdown. However, dismantling techniques assumed by TLG for equipment in this analysis are not consistent with removal techniques required for salvage (resale) of equipment. Experience has indicated that some buyers wanted equipment stripped down to very specific requirements before they would consider purchase. This required expensive rework after the equipment had been removed from its installed location. Since placing a salvage value on this machinery and equipment would be speculative, and the value would be small in comparison to the overall decommissioning expenses, this analysis does not attempt to quantify the possible salvage value that Xcel Energy may realize based upon those efforts.

It is assumed, for purposes of this analysis, that any value received from the sale of scrap generated in the dismantling process would be offset by the on-site processing costs. The dismantling techniques assumed in the decommissioning estimates do not include the additional cost for size reduction and preparation to meet "furnace ready" conditions. For example, the recovery of copper from electrical cabling may require the removal and disposition of any contaminated insulation, an added expense. With a volatile market, the potential profit margin in scrap recovery is highly speculative, regardless of the ability to free release this material. This assumption is an implicit recognition of scrap value in the disposal of clean metallic waste at no additional cost to the project.

Furniture, tools, mobile equipment such as forklifts, trucks, bulldozers, and other property will be removed at no cost or credit to the decommissioning project. Disposition may include relocation to other facilities. Spare parts will also be made available for alternative use.

The concrete debris resulting from building demolition activities is crushed on site to reduce the size of the debris. The resulting crushed concrete is disposed offsite as construction debris. The rebar removed from the concrete crushing process is disposed of as scrap steel in a similar fashion as other scrap metal as discussed previously.

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Asbestos

At the time of Prairie Island's construction, asbestos was still being used for system component and piping insulation, and as fireproofing material for structures. No inventory of asbestos at Prairie Island was available, so TLG developed an estimated quantity. The allowance for the remediation of this asbestos is captured in the detailed cost analyses (Appendices C through J).

Energy

For estimating purposes, the plant is assumed to be de-energized, except for those facilities associated with spent fuel storage. Replacement power costs are used for the cost of energy consumption during decommissioning for tooling, lighting, ventilation, and essential services.

Emergency Planning

FEMA and state fees associated with emergency planning are assumed to continue for approximately 18 months following the cessation of operations. At this time, the FEMA fees are discontinued. The timing is based upon the anticipated condition of the spent fuel (i.e., the hottest spent fuel assemblies are assumed to be cool enough that no substantial Zircaloy oxidation and off-site event would occur with the loss of spent fuel pool water). State and local fees are continued until all spent fuel is transferred out of the spent fuel pool.

Insurance

Costs for continuing coverage (nuclear liability and property insurance) following cessation of plant operations and during decommissioning are included and based upon current operating premiums. Reductions in premiums, throughout the decommissioning process, are based upon the guidance provided in SECY-00-0145, "Integrated Rulemaking Plan for Nuclear Power Plant Decommissioning."^[43] The NRC's financial protection requirements are based on various reactor (and spent fuel) configurations.

Site Non-Labor Overhead

These estimates include costs for site non-labor overhead charges. These costs include telephones, copy machines, computers, IT infrastructure, office supplies, janitorial supplies, training expenses, etc. Xcel Energy

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provided a two-part cost to address these costs. A variable charge of \$5,648 per person per year of the Xcel Energy staff is included throughout the estimate. A fixed annual overhead charge is also included, starting at \$1.5 million per reactor at the time of unit shut down and decreasing at various intervals to approximately \$163 thousand per reactor.

Severance Program

Severance for personnel retained for the decommissioning organization is included in this estimate.

Taxes

Property taxes are included for all decommissioning periods. Xcel Energy provided a schedule of decreasing tax payments against the current tax assessment. These payments are maintained for the balance of the decommissioning program.

NRC Fees

These estimates include charges from the NRC to support the Prairie Island decommissioning program. Charges are included for the yearly license held by Xcel Energy for the Part 50 licenses, as well as engineering support charges by the NRC to review activities at the site. The Part 50 license fee for a reactor in a decommissioning or possession-only status and which has spent fuel onsite is \$188 thousand per year. Once the reactors have been decommissioned, the site Part 50 license continues at the same fee until final removal of the spent fuel. The hourly rate for NRC review is \$279.00. The level of effort of NRC participation is commensurate with the decommissioning alternative and schedule.

Disposal of Processed Water

This estimate assumes that processed water which meets state and federal release limits can be disposed of without additional cost.

Site Modifications

The perimeter fence and in-plant security barriers will be moved, as appropriate, to conform to the Site Security Plan in force during the various stages of the project.

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Prairie Island Indian Community Payments

This estimate includes a \$2.5 million annual payment to the Prairie Island Indian Community while spent fuel is still on the Prairie Island site.

Minnesota state regulations regarding concrete

This estimate complies with the Minnesota state regulations regarding the removal of all subterranean concrete during demolition, plus the survey and confirmation of the suitability of the clean fill used for backfill of the subgrade structures following concrete removal.

3.7 COST ESTIMATE SUMMARY

The estimates presented in this document reflect the total cost to decontaminate the nuclear units, manage the spent fuel until the DOE is able to complete the transfer to a federal facility, dismantle the plant and restore the site for alternative use.

Schedules of expenditures are provided in Tables 3.1 through 3.16. The tables delineate the cost contributors by year of expenditures as well as cost contributor (e.g., labor, materials, and waste disposal).

Additional tables in Appendices C through J provide detailed cost elements. The cost elements are also assigned to one of three subcategories: "License Termination," "Spent Fuel Management," and "Site Restoration." The subcategory "License Termination" is used to accumulate costs that are consistent with "decommissioning" as defined by the NRC in its financial assurance regulations (i.e., 10 CFR §50.75). In situations where the long-term management of spent fuel is not an issue, the cost reported for this subcategory is generally sufficient to terminate each unit's operating license, recognizing that there may be some additional cost impact from spent fuel management.

The "Spent Fuel Management" subcategory contains costs associated with the containerization and transfer of spent fuel from the pool to the ISFSI for interim storage, and the transfer of the multipurpose canisters from the ISFSI to the DOE. Costs are also included for the operations of the pool and management of the ISFSI until such time that the transfer of all fuel from this facility to an off-site location (e.g., interim storage facility) is complete.

"Site Restoration" is used to capture costs associated with the dismantling and demolition of buildings and facilities demonstrated to be free from

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contamination. This includes structures never exposed to radioactive materials, as well as those facilities that have been decontaminated to appropriate levels. Structures are completely removed, including foundations and basemats and backfilled to conform to local grade.

As discussed in Section 3.5.1, it is assumed that the DOE will not accept the GTCC waste prior to completing the transfer of spent fuel. Therefore, the cost of GTCC disposal is shown in the final year of ISFSI operation (for the DECON alternative). While designated for disposal at a federal facility along with the spent fuel, GTCC waste is still classified as low-level radioactive waste and, as such, included as a “License Termination” expense.

Decommissioning costs are reported in 2020 dollars. Costs are not inflated, escalated, or discounted over the period of expenditure (or projected lifetime of the plant).

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TABLE 3.1
SCENARIO 1: DECON WITH 42 YEAR DFS, UNIT 1
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|------|--------|--------------------------|--------|--------|--------|---------|
| 2033 | 23,782 | 923 | 741 | 25 | 10,292 | 35,762 |
| 2034 | 67,414 | 9,626 | 2,605 | 5,533 | 21,280 | 106,458 |
| 2035 | 68,591 | 29,172 | 1,970 | 24,644 | 23,300 | 147,677 |
| 2036 | 64,154 | 24,188 | 1,598 | 31,001 | 24,350 | 145,292 |
| 2037 | 45,558 | 25,073 | 1,398 | 22,010 | 19,293 | 113,333 |
| 2038 | 25,712 | 31,391 | 1,284 | 1,217 | 11,074 | 70,678 |
| 2039 | 34,084 | 5,035 | 599 | 4,110 | 6,754 | 50,583 |
| 2040 | 20,889 | 6,593 | 253 | 16 | 4,536 | 32,287 |
| 2041 | 15,747 | 9,087 | 186 | 0 | 4,139 | 29,160 |
| 2042 | 9,317 | 4,776 | 88 | 0 | 3,765 | 17,945 |
| 2043 | 3,430 | 467 | 0 | 0 | 3,431 | 7,328 |
| 2044 | 3,387 | 311 | 0 | 0 | 3,440 | 7,139 |
| 2045 | 3,482 | 623 | 0 | 0 | 3,431 | 7,536 |
| 2046 | 3,482 | 623 | 0 | 0 | 3,431 | 7,536 |
| 2047 | 3,430 | 467 | 0 | 0 | 3,431 | 7,328 |
| 2048 | 3,491 | 623 | 0 | 0 | 3,440 | 7,554 |
| 2049 | 3,482 | 623 | 0 | 0 | 3,431 | 7,536 |
| 2050 | 3,430 | 467 | 0 | 0 | 3,431 | 7,328 |
| 2051 | 3,482 | 623 | 0 | 0 | 3,431 | 7,536 |
| 2052 | 3,439 | 467 | 0 | 0 | 3,440 | 7,346 |
| 2053 | 3,378 | 311 | 0 | 0 | 3,431 | 7,120 |
| 2054 | 3,378 | 311 | 0 | 0 | 3,431 | 7,120 |
| 2055 | 3,378 | 311 | 0 | 0 | 3,431 | 7,120 |
| 2056 | 3,284 | 0 | 0 | 0 | 3,440 | 6,724 |
| 2057 | 3,275 | 0 | 0 | 0 | 3,431 | 6,705 |
| 2058 | 3,275 | 0 | 0 | 0 | 3,431 | 6,705 |
| 2059 | 3,275 | 0 | 0 | 0 | 3,431 | 6,705 |
| 2060 | 3,387 | 311 | 0 | 0 | 3,440 | 7,139 |
| 2061 | 3,378 | 311 | 0 | 0 | 3,431 | 7,120 |
| 2062 | 3,378 | 311 | 0 | 0 | 3,431 | 7,120 |

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TABLE 3.1 (continued)
SCENARIO 1: DECON WITH 42 YEAR DFS, UNIT 1
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|--------------|----------------|--------------------------|---------------|---------------|----------------|----------------|
| 2063 | 3,378 | 311 | 0 | 0 | 3,431 | 7,120 |
| 2064 | 3,387 | 311 | 0 | 0 | 3,440 | 7,139 |
| 2065 | 3,378 | 311 | 0 | 0 | 3,431 | 7,120 |
| 2066 | 3,378 | 311 | 0 | 0 | 3,431 | 7,120 |
| 2067 | 3,378 | 311 | 0 | 0 | 3,431 | 7,120 |
| 2068 | 3,387 | 311 | 0 | 0 | 3,440 | 7,139 |
| 2069 | 3,378 | 311 | 0 | 0 | 3,431 | 7,120 |
| 2070 | 3,378 | 311 | 0 | 0 | 3,431 | 7,120 |
| 2071 | 3,378 | 311 | 0 | 0 | 3,431 | 7,120 |
| 2072 | 3,387 | 311 | 0 | 0 | 3,440 | 7,139 |
| 2073 | 3,378 | 311 | 0 | 0 | 3,431 | 7,120 |
| 2074 | 3,378 | 2,116 | 0 | 0 | 13,408 | 18,902 |
| 2075 | 886 | 554 | 20 | 3,165 | 1,924 | 6,549 |
| | | | | | | |
| Total | 484,624 | 159,120 | 10,742 | 91,722 | 250,544 | 996,753 |

Note: Columns may not add due to rounding

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TABLE 3.2
SCENARIO 1: DECON WITH 42 YEAR DFS, UNIT 2
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|------|--------|--------------------------|--------|--------|--------|---------|
| 2034 | 8,346 | 600 | 327 | 10 | 5,287 | 14,570 |
| 2035 | 49,894 | 6,051 | 2,191 | 2,472 | 28,487 | 89,096 |
| 2036 | 67,057 | 30,095 | 2,409 | 22,189 | 20,301 | 142,050 |
| 2037 | 75,292 | 40,738 | 1,676 | 30,330 | 20,209 | 168,245 |
| 2038 | 82,522 | 47,557 | 1,284 | 36,708 | 18,369 | 186,439 |
| 2039 | 39,423 | 5,799 | 599 | 5,008 | 6,511 | 57,340 |
| 2040 | 25,047 | 10,813 | 253 | 16 | 5,209 | 41,339 |
| 2041 | 18,516 | 15,396 | 186 | 0 | 5,303 | 39,401 |
| 2042 | 10,621 | 7,749 | 88 | 0 | 4,313 | 22,771 |
| 2043 | 3,430 | 467 | 0 | 0 | 3,431 | 7,328 |
| 2044 | 3,387 | 311 | 0 | 0 | 3,440 | 7,139 |
| 2045 | 3,482 | 623 | 0 | 0 | 3,431 | 7,536 |
| 2046 | 3,482 | 623 | 0 | 0 | 3,431 | 7,536 |
| 2047 | 3,430 | 467 | 0 | 0 | 3,431 | 7,328 |
| 2048 | 3,491 | 623 | 0 | 0 | 3,440 | 7,554 |
| 2049 | 3,482 | 623 | 0 | 0 | 3,431 | 7,536 |
| 2050 | 3,430 | 467 | 0 | 0 | 3,431 | 7,328 |
| 2051 | 3,482 | 623 | 0 | 0 | 3,431 | 7,536 |
| 2052 | 3,439 | 467 | 0 | 0 | 3,440 | 7,346 |
| 2053 | 3,378 | 311 | 0 | 0 | 3,431 | 7,120 |
| 2054 | 3,378 | 311 | 0 | 0 | 3,431 | 7,120 |
| 2055 | 3,378 | 311 | 0 | 0 | 3,431 | 7,120 |
| 2056 | 3,284 | 0 | 0 | 0 | 3,440 | 6,724 |
| 2057 | 3,275 | 0 | 0 | 0 | 3,431 | 6,705 |
| 2058 | 3,275 | 0 | 0 | 0 | 3,431 | 6,705 |
| 2059 | 3,275 | 0 | 0 | 0 | 3,431 | 6,705 |
| 2060 | 3,387 | 311 | 0 | 0 | 3,440 | 7,139 |
| 2061 | 3,378 | 311 | 0 | 0 | 3,431 | 7,120 |
| 2062 | 3,378 | 311 | 0 | 0 | 3,431 | 7,120 |
| 2063 | 3,378 | 311 | 0 | 0 | 3,431 | 7,120 |

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TABLE 3.2 (continued)
SCENARIO 1: DECON WITH 42 YEAR DFS, UNIT 2
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|--------------|----------------|--------------------------|--------------|---------------|----------------|------------------|
| 2064 | 3,387 | 311 | 0 | 0 | 3,440 | 7,139 |
| 2065 | 3,378 | 311 | 0 | 0 | 3,431 | 7,120 |
| 2066 | 3,378 | 311 | 0 | 0 | 3,431 | 7,120 |
| 2067 | 3,378 | 311 | 0 | 0 | 3,431 | 7,120 |
| 2068 | 3,387 | 311 | 0 | 0 | 3,440 | 7,139 |
| 2069 | 3,378 | 311 | 0 | 0 | 3,431 | 7,120 |
| 2070 | 3,378 | 311 | 0 | 0 | 3,431 | 7,120 |
| 2071 | 3,378 | 311 | 0 | 0 | 3,431 | 7,120 |
| 2072 | 3,387 | 311 | 0 | 0 | 3,440 | 7,139 |
| 2073 | 3,378 | 311 | 0 | 0 | 3,431 | 7,120 |
| 2074 | 3,378 | 2,116 | 0 | 0 | 13,408 | 18,902 |
| 2075 | 886 | 554 | 20 | 3,165 | 1,924 | 6,549 |
| | | | | | | |
| Total | 486,095 | 178,053 | 9,033 | 99,899 | 235,749 | 1,008,829 |

Note: Columns may not add due to rounding

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TABLE 3.3
SCENARIO 2: DECON WITH 60 YEAR DFS, UNIT 1
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|------|--------|--------------------------|--------|--------|--------|---------|
| 2033 | 23,782 | 923 | 741 | 25 | 10,292 | 35,762 |
| 2034 | 67,414 | 9,626 | 2,605 | 5,533 | 21,280 | 106,458 |
| 2035 | 68,591 | 29,172 | 1,970 | 24,644 | 23,300 | 147,677 |
| 2036 | 64,127 | 24,105 | 1,598 | 31,001 | 24,350 | 145,182 |
| 2037 | 45,510 | 24,928 | 1,398 | 22,010 | 19,293 | 113,140 |
| 2038 | 25,609 | 31,083 | 1,284 | 1,217 | 11,074 | 70,267 |
| 2039 | 33,735 | 3,985 | 599 | 4,110 | 6,754 | 49,183 |
| 2040 | 20,663 | 5,915 | 253 | 16 | 4,536 | 31,383 |
| 2041 | 15,525 | 8,421 | 186 | 0 | 4,139 | 28,272 |
| 2042 | 9,047 | 3,968 | 88 | 0 | 3,758 | 16,861 |
| 2043 | 3,275 | 0 | 0 | 0 | 3,418 | 6,692 |
| 2044 | 3,284 | 0 | 0 | 0 | 3,427 | 6,711 |
| 2045 | 3,275 | 0 | 0 | 0 | 3,418 | 6,692 |
| 2046 | 3,275 | 0 | 0 | 0 | 3,418 | 6,692 |
| 2047 | 3,275 | 0 | 0 | 0 | 3,418 | 6,692 |
| 2048 | 3,284 | 0 | 0 | 0 | 3,427 | 6,711 |
| 2049 | 3,275 | 0 | 0 | 0 | 3,418 | 6,692 |
| 2050 | 3,275 | 0 | 0 | 0 | 3,418 | 6,692 |
| 2051 | 3,275 | 0 | 0 | 0 | 3,418 | 6,692 |
| 2052 | 3,284 | 0 | 0 | 0 | 3,427 | 6,711 |
| 2053 | 3,378 | 311 | 0 | 0 | 3,418 | 7,107 |
| 2054 | 3,482 | 623 | 0 | 0 | 3,418 | 7,523 |
| 2055 | 3,482 | 623 | 0 | 0 | 3,418 | 7,523 |
| 2056 | 3,543 | 778 | 0 | 0 | 3,427 | 7,749 |
| 2057 | 3,430 | 467 | 0 | 0 | 3,418 | 7,315 |
| 2058 | 3,586 | 934 | 0 | 0 | 3,418 | 7,938 |
| 2059 | 3,430 | 467 | 0 | 0 | 3,418 | 7,315 |
| 2060 | 3,387 | 311 | 0 | 0 | 3,427 | 7,126 |
| 2061 | 3,482 | 623 | 0 | 0 | 3,418 | 7,523 |
| 2062 | 3,482 | 623 | 0 | 0 | 3,418 | 7,523 |

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TABLE 3.3 (continued)
SCENARIO 2: DECON WITH 60 YEAR DFS, UNIT 1
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|--------------|----------------|--------------------------|---------------|---------------|----------------|------------------|
| 2063 | 3,430 | 467 | 0 | 0 | 3,418 | 7,315 |
| 2064 | 3,491 | 623 | 0 | 0 | 3,427 | 7,541 |
| 2065 | 3,482 | 623 | 0 | 0 | 3,418 | 7,523 |
| 2066 | 3,430 | 467 | 0 | 0 | 3,418 | 7,315 |
| 2067 | 3,482 | 623 | 0 | 0 | 3,418 | 7,523 |
| 2068 | 3,491 | 623 | 0 | 0 | 3,427 | 7,541 |
| 2069 | 3,430 | 467 | 0 | 0 | 3,418 | 7,315 |
| 2070 | 3,482 | 623 | 0 | 0 | 3,418 | 7,523 |
| 2071 | 3,482 | 623 | 0 | 0 | 3,418 | 7,523 |
| 2072 | 3,491 | 623 | 0 | 0 | 3,427 | 7,541 |
| 2073 | 3,482 | 623 | 0 | 0 | 3,418 | 7,523 |
| 2074 | 3,482 | 623 | 0 | 0 | 3,418 | 7,523 |
| 2075 | 3,842 | 1,702 | 0 | 0 | 3,418 | 8,962 |
| 2076 | 3,491 | 623 | 0 | 0 | 3,427 | 7,541 |
| 2077 | 3,482 | 2,428 | 0 | 0 | 13,395 | 19,305 |
| 2078 | 886 | 554 | 20 | 3,165 | 1,924 | 6,549 |
| | | | | | | |
| Total | 494,817 | 160,199 | 10,742 | 91,722 | 260,384 | 1,017,865 |

Note: Columns may not add due to rounding

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TABLE 3.4
SCENARIO 2: DECON WITH 60 YEAR DFS, UNIT 2
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|------|--------|--------------------------|--------|--------|--------|---------|
| 2034 | 8,346 | 600 | 327 | 10 | 5,287 | 14,570 |
| 2035 | 49,894 | 6,051 | 2,191 | 2,472 | 28,487 | 89,096 |
| 2036 | 67,020 | 29,984 | 2,409 | 22,189 | 20,301 | 141,903 |
| 2037 | 75,245 | 40,598 | 1,676 | 30,330 | 20,209 | 168,058 |
| 2038 | 82,427 | 47,271 | 1,284 | 36,708 | 18,369 | 186,059 |
| 2039 | 39,073 | 4,749 | 599 | 5,008 | 6,511 | 55,940 |
| 2040 | 24,821 | 10,135 | 253 | 16 | 5,209 | 40,435 |
| 2041 | 18,294 | 14,730 | 186 | 0 | 5,303 | 38,514 |
| 2042 | 10,352 | 6,941 | 88 | 0 | 4,306 | 21,688 |
| 2043 | 3,275 | 0 | 0 | 0 | 3,418 | 6,692 |
| 2044 | 3,284 | 0 | 0 | 0 | 3,427 | 6,711 |
| 2045 | 3,275 | 0 | 0 | 0 | 3,418 | 6,692 |
| 2046 | 3,275 | 0 | 0 | 0 | 3,418 | 6,692 |
| 2047 | 3,275 | 0 | 0 | 0 | 3,418 | 6,692 |
| 2048 | 3,284 | 0 | 0 | 0 | 3,427 | 6,711 |
| 2049 | 3,275 | 0 | 0 | 0 | 3,418 | 6,692 |
| 2050 | 3,275 | 0 | 0 | 0 | 3,418 | 6,692 |
| 2051 | 3,275 | 0 | 0 | 0 | 3,418 | 6,692 |
| 2052 | 3,284 | 0 | 0 | 0 | 3,427 | 6,711 |
| 2053 | 3,378 | 311 | 0 | 0 | 3,418 | 7,107 |
| 2054 | 3,482 | 623 | 0 | 0 | 3,418 | 7,523 |
| 2055 | 3,482 | 623 | 0 | 0 | 3,418 | 7,523 |
| 2056 | 3,543 | 778 | 0 | 0 | 3,427 | 7,749 |
| 2057 | 3,430 | 467 | 0 | 0 | 3,418 | 7,315 |
| 2058 | 3,586 | 934 | 0 | 0 | 3,418 | 7,938 |
| 2059 | 3,430 | 467 | 0 | 0 | 3,418 | 7,315 |
| 2060 | 3,387 | 311 | 0 | 0 | 3,427 | 7,126 |
| 2061 | 3,482 | 623 | 0 | 0 | 3,418 | 7,523 |
| 2062 | 3,482 | 623 | 0 | 0 | 3,418 | 7,523 |
| 2063 | 3,430 | 467 | 0 | 0 | 3,418 | 7,315 |

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TABLE 3.4 (continued)
SCENARIO 2: DECON WITH 60 YEAR DFS, UNIT 2
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|--------------|----------------|--------------------------|--------------|---------------|----------------|------------------|
| 2064 | 3,491 | 623 | 0 | 0 | 3,427 | 7,541 |
| 2065 | 3,482 | 623 | 0 | 0 | 3,418 | 7,523 |
| 2066 | 3,430 | 467 | 0 | 0 | 3,418 | 7,315 |
| 2067 | 3,482 | 623 | 0 | 0 | 3,418 | 7,523 |
| 2068 | 3,491 | 623 | 0 | 0 | 3,427 | 7,541 |
| 2069 | 3,430 | 467 | 0 | 0 | 3,418 | 7,315 |
| 2070 | 3,482 | 623 | 0 | 0 | 3,418 | 7,523 |
| 2071 | 3,482 | 623 | 0 | 0 | 3,418 | 7,523 |
| 2072 | 3,491 | 623 | 0 | 0 | 3,427 | 7,541 |
| 2073 | 3,482 | 623 | 0 | 0 | 3,418 | 7,523 |
| 2074 | 3,482 | 623 | 0 | 0 | 3,418 | 7,523 |
| 2075 | 3,842 | 1,702 | 0 | 0 | 3,418 | 8,962 |
| 2076 | 3,491 | 623 | 0 | 0 | 3,427 | 7,541 |
| 2077 | 3,482 | 2,428 | 0 | 0 | 13,395 | 19,305 |
| 2078 | 886 | 554 | 20 | 3,165 | 1,924 | 6,549 |
| | | | | | | |
| Total | 496,288 | 179,133 | 9,033 | 99,899 | 245,588 | 1,029,941 |

Note: Columns may not add due to rounding

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TABLE 3.5
SCENARIO 3: DECON WITH 100 YEAR DFS, UNIT 1
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|------|--------|--------------------------|--------|--------|--------|---------|
| 2033 | 23,782 | 923 | 741 | 25 | 10,292 | 35,762 |
| 2034 | 67,414 | 9,626 | 2,605 | 5,533 | 21,280 | 106,458 |
| 2035 | 68,591 | 29,172 | 1,970 | 24,644 | 23,300 | 147,677 |
| 2036 | 64,616 | 25,575 | 1,598 | 31,001 | 24,350 | 147,141 |
| 2037 | 46,367 | 27,499 | 1,398 | 22,010 | 19,293 | 116,568 |
| 2038 | 26,103 | 32,563 | 1,284 | 1,217 | 11,074 | 72,241 |
| 2039 | 33,735 | 3,985 | 599 | 4,110 | 6,754 | 49,183 |
| 2040 | 20,722 | 5,915 | 253 | 16 | 4,536 | 31,442 |
| 2041 | 15,615 | 8,421 | 186 | 0 | 4,139 | 28,362 |
| 2042 | 9,448 | 3,968 | 88 | 0 | 3,744 | 17,249 |
| 2043 | 3,952 | 0 | 0 | 0 | 3,392 | 7,344 |
| 2044 | 3,963 | 0 | 0 | 0 | 3,401 | 7,364 |
| 2045 | 5,466 | 4,542 | 0 | 0 | 3,392 | 13,400 |
| 2046 | 4,962 | 3,028 | 0 | 0 | 3,392 | 11,382 |
| 2047 | 4,962 | 3,028 | 0 | 0 | 3,392 | 11,382 |
| 2048 | 3,963 | 0 | 0 | 0 | 3,401 | 7,364 |
| 2049 | 4,962 | 3,028 | 0 | 0 | 3,392 | 11,382 |
| 2050 | 5,466 | 4,542 | 0 | 0 | 3,392 | 13,400 |
| 2051 | 5,412 | 4,378 | 0 | 0 | 3,392 | 13,181 |
| 2052 | 5,477 | 4,542 | 0 | 0 | 3,401 | 13,421 |
| 2053 | 3,952 | 0 | 0 | 0 | 3,392 | 7,344 |
| 2054 | 3,952 | 0 | 0 | 0 | 3,392 | 7,344 |
| 2055 | 5,466 | 4,542 | 0 | 0 | 3,392 | 13,400 |
| 2056 | 4,972 | 3,028 | 0 | 0 | 3,401 | 11,402 |
| 2057 | 4,962 | 3,028 | 0 | 0 | 3,392 | 11,382 |
| 2058 | 3,952 | 0 | 0 | 0 | 3,392 | 7,344 |
| 2059 | 4,907 | 2,864 | 0 | 0 | 3,392 | 11,162 |
| 2060 | 4,972 | 3,028 | 0 | 0 | 3,401 | 11,402 |
| 2061 | 4,962 | 3,028 | 0 | 0 | 3,392 | 11,382 |
| 2062 | 3,952 | 0 | 0 | 0 | 3,392 | 7,344 |

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TABLE 3.5 (continued)
SCENARIO 3: DECON WITH 100 YEAR DFS, UNIT 1
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|------|--------|--------------------------|--------|--------|-------|--------|
| 2063 | 6,980 | 9,085 | 0 | 0 | 3,392 | 19,457 |
| 2064 | 5,927 | 5,892 | 0 | 0 | 3,401 | 15,220 |
| 2065 | 4,962 | 3,028 | 0 | 0 | 3,392 | 11,382 |
| 2066 | 3,952 | 0 | 0 | 0 | 3,392 | 7,344 |
| 2067 | 3,952 | 0 | 0 | 0 | 3,392 | 7,344 |
| 2068 | 5,982 | 6,057 | 0 | 0 | 3,401 | 15,439 |
| 2069 | 5,466 | 4,542 | 0 | 0 | 3,392 | 13,400 |
| 2070 | 3,952 | 0 | 0 | 0 | 3,392 | 7,344 |
| 2071 | 3,952 | 0 | 0 | 0 | 3,392 | 7,344 |
| 2072 | 6,432 | 7,406 | 0 | 0 | 3,401 | 17,239 |
| 2073 | 3,952 | 0 | 0 | 0 | 3,392 | 7,344 |
| 2074 | 3,952 | 0 | 0 | 0 | 3,392 | 7,344 |
| 2075 | 6,836 | 8,650 | 0 | 0 | 3,392 | 18,877 |
| 2076 | 3,963 | 0 | 0 | 0 | 3,401 | 7,364 |
| 2077 | 3,952 | 0 | 0 | 0 | 3,392 | 7,344 |
| 2078 | 6,476 | 7,571 | 0 | 0 | 3,392 | 17,438 |
| 2079 | 3,952 | 0 | 0 | 0 | 3,392 | 7,344 |
| 2080 | 3,963 | 0 | 0 | 0 | 3,401 | 7,364 |
| 2081 | 3,952 | 0 | 0 | 0 | 3,392 | 7,344 |
| 2082 | 6,366 | 7,242 | 0 | 0 | 3,392 | 17,000 |
| 2083 | 3,952 | 0 | 0 | 0 | 3,392 | 7,344 |
| 2084 | 3,963 | 0 | 0 | 0 | 3,401 | 7,364 |
| 2085 | 3,952 | 0 | 0 | 0 | 3,392 | 7,344 |
| 2086 | 3,952 | 0 | 0 | 0 | 3,392 | 7,344 |
| 2087 | 3,952 | 0 | 0 | 0 | 3,392 | 7,344 |
| 2088 | 19,160 | 45,618 | 0 | 2,988 | 3,924 | 71,690 |
| 2089 | 3,952 | 0 | 0 | 0 | 3,392 | 7,344 |
| 2090 | 3,952 | 0 | 0 | 0 | 3,392 | 7,344 |
| 2091 | 3,952 | 0 | 0 | 0 | 3,392 | 7,344 |
| 2092 | 3,963 | 0 | 0 | 0 | 3,401 | 7,364 |

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TABLE 3.5 (continued)
SCENARIO 3: DECON WITH 100 YEAR DFS, UNIT 1
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|--------------|----------------|--------------------------|---------------|---------------|----------------|------------------|
| 2093 | 4,056 | 311 | 0 | 0 | 3,392 | 7,759 |
| 2094 | 4,212 | 778 | 0 | 0 | 3,392 | 8,382 |
| 2095 | 5,730 | 5,335 | 0 | 0 | 3,392 | 14,457 |
| 2096 | 5,287 | 3,972 | 0 | 0 | 3,401 | 12,659 |
| 2097 | 5,120 | 3,504 | 0 | 0 | 3,392 | 12,017 |
| 2098 | 4,315 | 1,090 | 0 | 0 | 3,392 | 8,797 |
| 2099 | 5,120 | 3,504 | 0 | 0 | 3,392 | 12,017 |
| 2100 | 5,575 | 4,868 | 0 | 0 | 3,392 | 13,834 |
| 2101 | 5,730 | 5,335 | 0 | 0 | 3,392 | 14,457 |
| 2102 | 5,730 | 5,335 | 0 | 0 | 3,392 | 14,457 |
| 2103 | 4,108 | 467 | 0 | 0 | 3,392 | 7,967 |
| 2104 | 4,171 | 623 | 0 | 0 | 3,401 | 8,194 |
| 2105 | 5,679 | 5,179 | 0 | 0 | 3,392 | 14,249 |
| 2106 | 5,120 | 3,504 | 0 | 0 | 3,392 | 12,017 |
| 2107 | 5,172 | 3,660 | 0 | 0 | 3,392 | 12,224 |
| 2108 | 4,171 | 623 | 0 | 0 | 3,401 | 8,194 |
| 2109 | 5,120 | 3,504 | 0 | 0 | 3,392 | 12,017 |
| 2110 | 5,172 | 3,660 | 0 | 0 | 3,392 | 12,224 |
| 2111 | 5,172 | 3,660 | 0 | 0 | 3,392 | 12,224 |
| 2112 | 4,171 | 623 | 0 | 0 | 3,401 | 8,194 |
| 2113 | 7,197 | 9,735 | 0 | 0 | 3,392 | 20,324 |
| 2114 | 6,185 | 6,698 | 0 | 0 | 3,392 | 16,274 |
| 2115 | 5,532 | 4,739 | 0 | 0 | 3,392 | 13,663 |
| 2116 | 4,171 | 623 | 0 | 0 | 3,401 | 8,194 |
| 2117 | 4,134 | 2,428 | 0 | 0 | 13,370 | 19,932 |
| 2118 | 1,124 | 887 | 20 | 177 | 1,957 | 4,164 |
| | | | | | | |
| Total | 751,975 | 383,995 | 10,742 | 91,722 | 395,765 | 1,634,199 |

Note: Columns may not add due to rounding

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TABLE 3.6
SCENARIO 3: DECON WITH 100 YEAR DFS, UNIT 2
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|------|--------|--------------------------|--------|--------|--------|---------|
| 2034 | 8,346 | 600 | 327 | 10 | 5,287 | 14,570 |
| 2035 | 49,894 | 6,051 | 2,191 | 2,472 | 28,487 | 89,096 |
| 2036 | 67,674 | 31,946 | 2,409 | 22,189 | 20,301 | 144,519 |
| 2037 | 76,073 | 43,082 | 1,676 | 30,330 | 20,209 | 171,370 |
| 2038 | 82,785 | 48,346 | 1,284 | 36,708 | 18,369 | 187,492 |
| 2039 | 39,073 | 4,749 | 599 | 5,008 | 6,511 | 55,940 |
| 2040 | 24,880 | 10,135 | 253 | 16 | 5,209 | 40,493 |
| 2041 | 18,384 | 14,730 | 186 | 0 | 5,303 | 38,604 |
| 2042 | 10,753 | 6,941 | 88 | 0 | 4,292 | 22,075 |
| 2043 | 3,952 | 0 | 0 | 0 | 3,392 | 7,344 |
| 2044 | 3,963 | 0 | 0 | 0 | 3,401 | 7,364 |
| 2045 | 5,466 | 4,542 | 0 | 0 | 3,392 | 13,400 |
| 2046 | 4,962 | 3,028 | 0 | 0 | 3,392 | 11,382 |
| 2047 | 4,962 | 3,028 | 0 | 0 | 3,392 | 11,382 |
| 2048 | 3,963 | 0 | 0 | 0 | 3,401 | 7,364 |
| 2049 | 4,962 | 3,028 | 0 | 0 | 3,392 | 11,382 |
| 2050 | 5,466 | 4,542 | 0 | 0 | 3,392 | 13,400 |
| 2051 | 5,412 | 4,378 | 0 | 0 | 3,392 | 13,181 |
| 2052 | 5,477 | 4,542 | 0 | 0 | 3,401 | 13,421 |
| 2053 | 3,952 | 0 | 0 | 0 | 3,392 | 7,344 |
| 2054 | 3,952 | 0 | 0 | 0 | 3,392 | 7,344 |
| 2055 | 5,466 | 4,542 | 0 | 0 | 3,392 | 13,400 |
| 2056 | 4,972 | 3,028 | 0 | 0 | 3,401 | 11,402 |
| 2057 | 4,962 | 3,028 | 0 | 0 | 3,392 | 11,382 |
| 2058 | 3,952 | 0 | 0 | 0 | 3,392 | 7,344 |
| 2059 | 4,907 | 2,864 | 0 | 0 | 3,392 | 11,162 |
| 2060 | 4,972 | 3,028 | 0 | 0 | 3,401 | 11,402 |
| 2061 | 4,962 | 3,028 | 0 | 0 | 3,392 | 11,382 |
| 2062 | 3,952 | 0 | 0 | 0 | 3,392 | 7,344 |
| 2063 | 6,980 | 9,085 | 0 | 0 | 3,392 | 19,457 |

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TABLE 3.6 (continued)
SCENARIO 3: DECON WITH 100 YEAR DFS, UNIT 2
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|------|--------|--------------------------|--------|--------|-------|--------|
| 2064 | 5,927 | 5,892 | 0 | 0 | 3,401 | 15,220 |
| 2065 | 4,962 | 3,028 | 0 | 0 | 3,392 | 11,382 |
| 2066 | 3,952 | 0 | 0 | 0 | 3,392 | 7,344 |
| 2067 | 3,952 | 0 | 0 | 0 | 3,392 | 7,344 |
| 2068 | 5,982 | 6,057 | 0 | 0 | 3,401 | 15,439 |
| 2069 | 5,466 | 4,542 | 0 | 0 | 3,392 | 13,400 |
| 2070 | 3,952 | 0 | 0 | 0 | 3,392 | 7,344 |
| 2071 | 3,952 | 0 | 0 | 0 | 3,392 | 7,344 |
| 2072 | 6,432 | 7,406 | 0 | 0 | 3,401 | 17,239 |
| 2073 | 3,952 | 0 | 0 | 0 | 3,392 | 7,344 |
| 2074 | 3,952 | 0 | 0 | 0 | 3,392 | 7,344 |
| 2075 | 6,836 | 8,650 | 0 | 0 | 3,392 | 18,877 |
| 2076 | 3,963 | 0 | 0 | 0 | 3,401 | 7,364 |
| 2077 | 3,952 | 0 | 0 | 0 | 3,392 | 7,344 |
| 2078 | 6,476 | 7,571 | 0 | 0 | 3,392 | 17,438 |
| 2079 | 3,952 | 0 | 0 | 0 | 3,392 | 7,344 |
| 2080 | 3,963 | 0 | 0 | 0 | 3,401 | 7,364 |
| 2081 | 3,952 | 0 | 0 | 0 | 3,392 | 7,344 |
| 2082 | 6,366 | 7,242 | 0 | 0 | 3,392 | 17,000 |
| 2083 | 3,952 | 0 | 0 | 0 | 3,392 | 7,344 |
| 2084 | 3,963 | 0 | 0 | 0 | 3,401 | 7,364 |
| 2085 | 3,952 | 0 | 0 | 0 | 3,392 | 7,344 |
| 2086 | 3,952 | 0 | 0 | 0 | 3,392 | 7,344 |
| 2087 | 3,952 | 0 | 0 | 0 | 3,392 | 7,344 |
| 2088 | 19,160 | 45,618 | 0 | 2,988 | 3,924 | 71,690 |
| 2089 | 3,952 | 0 | 0 | 0 | 3,392 | 7,344 |
| 2090 | 3,952 | 0 | 0 | 0 | 3,392 | 7,344 |
| 2091 | 3,952 | 0 | 0 | 0 | 3,392 | 7,344 |
| 2092 | 3,963 | 0 | 0 | 0 | 3,401 | 7,364 |
| 2093 | 4,056 | 311 | 0 | 0 | 3,392 | 7,759 |

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TABLE 3.6 (continued)
SCENARIO 3: DECON WITH 100 YEAR DFS, UNIT 2
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|--------------|----------------|--------------------------|--------------|---------------|----------------|------------------|
| 2094 | 4,212 | 778 | 0 | 0 | 3,392 | 8,382 |
| 2095 | 5,730 | 5,335 | 0 | 0 | 3,392 | 14,457 |
| 2096 | 5,287 | 3,972 | 0 | 0 | 3,401 | 12,659 |
| 2097 | 5,120 | 3,504 | 0 | 0 | 3,392 | 12,017 |
| 2098 | 4,315 | 1,090 | 0 | 0 | 3,392 | 8,797 |
| 2099 | 5,120 | 3,504 | 0 | 0 | 3,392 | 12,017 |
| 2100 | 5,575 | 4,868 | 0 | 0 | 3,392 | 13,834 |
| 2101 | 5,730 | 5,335 | 0 | 0 | 3,392 | 14,457 |
| 2102 | 5,730 | 5,335 | 0 | 0 | 3,392 | 14,457 |
| 2103 | 4,108 | 467 | 0 | 0 | 3,392 | 7,967 |
| 2104 | 4,171 | 623 | 0 | 0 | 3,401 | 8,194 |
| 2105 | 5,679 | 5,179 | 0 | 0 | 3,392 | 14,249 |
| 2106 | 5,120 | 3,504 | 0 | 0 | 3,392 | 12,017 |
| 2107 | 5,172 | 3,660 | 0 | 0 | 3,392 | 12,224 |
| 2108 | 4,171 | 623 | 0 | 0 | 3,401 | 8,194 |
| 2109 | 5,120 | 3,504 | 0 | 0 | 3,392 | 12,017 |
| 2110 | 5,172 | 3,660 | 0 | 0 | 3,392 | 12,224 |
| 2111 | 5,172 | 3,660 | 0 | 0 | 3,392 | 12,224 |
| 2112 | 4,171 | 623 | 0 | 0 | 3,401 | 8,194 |
| 2113 | 7,197 | 9,735 | 0 | 0 | 3,392 | 20,324 |
| 2114 | 6,185 | 6,698 | 0 | 0 | 3,392 | 16,274 |
| 2115 | 5,532 | 4,739 | 0 | 0 | 3,392 | 13,663 |
| 2116 | 4,171 | 623 | 0 | 0 | 3,401 | 8,194 |
| 2117 | 4,134 | 2,428 | 0 | 0 | 13,370 | 19,932 |
| 2118 | 1,124 | 887 | 20 | 177 | 1,957 | 4,164 |
| | | | | | | |
| Total | 753,446 | 402,928 | 9,033 | 99,898 | 380,970 | 1,646,275 |

Note: Columns may not add due to rounding

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TABLE 3.7
SCENARIO 4: DECON WITH 200 YEAR DFS, UNIT 1
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|------|--------|--------------------------|--------|--------|--------|---------|
| 2033 | 23,782 | 923 | 741 | 25 | 10,292 | 35,762 |
| 2034 | 67,414 | 9,626 | 2,605 | 5,533 | 21,280 | 106,458 |
| 2035 | 68,591 | 29,172 | 1,970 | 24,644 | 23,300 | 147,677 |
| 2036 | 64,616 | 25,575 | 1,598 | 31,001 | 24,350 | 147,141 |
| 2037 | 46,367 | 27,499 | 1,398 | 22,010 | 19,293 | 116,568 |
| 2038 | 26,103 | 32,563 | 1,284 | 1,217 | 11,074 | 72,241 |
| 2039 | 33,735 | 3,985 | 599 | 4,110 | 6,754 | 49,183 |
| 2040 | 20,722 | 5,915 | 253 | 16 | 4,536 | 31,442 |
| 2041 | 15,615 | 8,421 | 186 | 0 | 4,139 | 28,362 |
| 2042 | 9,448 | 3,968 | 88 | 0 | 3,737 | 17,241 |
| 2043 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2044 | 3,963 | 0 | 0 | 0 | 3,387 | 7,350 |
| 2045 | 5,466 | 4,542 | 0 | 0 | 3,378 | 13,386 |
| 2046 | 4,962 | 3,028 | 0 | 0 | 3,378 | 11,367 |
| 2047 | 4,962 | 3,028 | 0 | 0 | 3,378 | 11,367 |
| 2048 | 3,963 | 0 | 0 | 0 | 3,387 | 7,350 |
| 2049 | 4,962 | 3,028 | 0 | 0 | 3,378 | 11,367 |
| 2050 | 5,466 | 4,542 | 0 | 0 | 3,378 | 13,386 |
| 2051 | 5,412 | 4,378 | 0 | 0 | 3,378 | 13,167 |
| 2052 | 5,477 | 4,542 | 0 | 0 | 3,387 | 13,406 |
| 2053 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2054 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2055 | 5,466 | 4,542 | 0 | 0 | 3,378 | 13,386 |
| 2056 | 4,972 | 3,028 | 0 | 0 | 3,387 | 11,388 |
| 2057 | 4,962 | 3,028 | 0 | 0 | 3,378 | 11,367 |
| 2058 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2059 | 4,907 | 2,864 | 0 | 0 | 3,378 | 11,148 |
| 2060 | 4,972 | 3,028 | 0 | 0 | 3,387 | 11,388 |
| 2061 | 4,962 | 3,028 | 0 | 0 | 3,378 | 11,367 |
| 2062 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |

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TABLE 3.7 (continued)
SCENARIO 4: DECON WITH 200 YEAR DFS, UNIT 1
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|------|--------|--------------------------|--------|--------|-------|--------|
| 2063 | 6,980 | 9,085 | 0 | 0 | 3,378 | 19,443 |
| 2064 | 5,927 | 5,892 | 0 | 0 | 3,387 | 15,206 |
| 2065 | 4,962 | 3,028 | 0 | 0 | 3,378 | 11,367 |
| 2066 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2067 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2068 | 5,982 | 6,057 | 0 | 0 | 3,387 | 15,425 |
| 2069 | 5,466 | 4,542 | 0 | 0 | 3,378 | 13,386 |
| 2070 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2071 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2072 | 6,432 | 7,406 | 0 | 0 | 3,387 | 17,225 |
| 2073 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2074 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2075 | 6,836 | 8,650 | 0 | 0 | 3,378 | 18,863 |
| 2076 | 3,963 | 0 | 0 | 0 | 3,387 | 7,350 |
| 2077 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2078 | 6,476 | 7,571 | 0 | 0 | 3,378 | 17,424 |
| 2079 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2080 | 3,963 | 0 | 0 | 0 | 3,387 | 7,350 |
| 2081 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2082 | 6,366 | 7,242 | 0 | 0 | 3,378 | 16,986 |
| 2083 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2084 | 3,963 | 0 | 0 | 0 | 3,387 | 7,350 |
| 2085 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2086 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2087 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2088 | 19,160 | 45,618 | 0 | 2,988 | 3,910 | 71,675 |
| 2089 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2090 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2091 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2092 | 3,963 | 0 | 0 | 0 | 3,387 | 7,350 |

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TABLE 3.7 (continued)
SCENARIO 4: DECON WITH 200 YEAR DFS, UNIT 1
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|------|-------|--------------------------|--------|--------|-------|--------|
| 2093 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2094 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2095 | 5,471 | 4,556 | 0 | 0 | 3,378 | 13,405 |
| 2096 | 4,976 | 3,037 | 0 | 0 | 3,387 | 11,400 |
| 2097 | 4,965 | 3,037 | 0 | 0 | 3,378 | 11,380 |
| 2098 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2099 | 4,965 | 3,037 | 0 | 0 | 3,378 | 11,380 |
| 2100 | 5,471 | 4,556 | 0 | 0 | 3,378 | 13,405 |
| 2101 | 5,471 | 4,556 | 0 | 0 | 3,378 | 13,405 |
| 2102 | 5,471 | 4,556 | 0 | 0 | 3,378 | 13,405 |
| 2103 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2104 | 3,963 | 0 | 0 | 0 | 3,387 | 7,350 |
| 2105 | 5,471 | 4,556 | 0 | 0 | 3,378 | 13,405 |
| 2106 | 4,965 | 3,037 | 0 | 0 | 3,378 | 11,380 |
| 2107 | 4,965 | 3,037 | 0 | 0 | 3,378 | 11,380 |
| 2108 | 3,963 | 0 | 0 | 0 | 3,387 | 7,350 |
| 2109 | 4,965 | 3,037 | 0 | 0 | 3,378 | 11,380 |
| 2110 | 4,965 | 3,037 | 0 | 0 | 3,378 | 11,380 |
| 2111 | 4,965 | 3,037 | 0 | 0 | 3,378 | 11,380 |
| 2112 | 3,963 | 0 | 0 | 0 | 3,387 | 7,350 |
| 2113 | 6,990 | 9,112 | 0 | 0 | 3,378 | 19,480 |
| 2114 | 5,977 | 6,075 | 0 | 0 | 3,378 | 15,430 |
| 2115 | 5,324 | 4,117 | 0 | 0 | 3,378 | 12,819 |
| 2116 | 3,963 | 0 | 0 | 0 | 3,387 | 7,350 |
| 2117 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2118 | 5,977 | 6,075 | 0 | 0 | 3,378 | 15,430 |
| 2119 | 5,471 | 4,556 | 0 | 0 | 3,378 | 13,405 |
| 2120 | 3,963 | 0 | 0 | 0 | 3,387 | 7,350 |
| 2121 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2122 | 6,483 | 7,594 | 0 | 0 | 3,378 | 17,455 |

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TABLE 3.7 (continued)
SCENARIO 4: DECON WITH 200 YEAR DFS, UNIT 1
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|------|--------|--------------------------|--------|--------|-------|--------|
| 2123 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2124 | 3,963 | 0 | 0 | 0 | 3,387 | 7,350 |
| 2125 | 6,483 | 7,594 | 0 | 0 | 3,378 | 17,455 |
| 2126 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2127 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2128 | 6,494 | 7,594 | 0 | 0 | 3,387 | 17,475 |
| 2129 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2130 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2131 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2132 | 6,494 | 7,594 | 0 | 0 | 3,387 | 17,475 |
| 2133 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2134 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2135 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2136 | 3,963 | 0 | 0 | 0 | 3,387 | 7,350 |
| 2137 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2138 | 19,139 | 45,562 | 0 | 0 | 3,378 | 68,079 |
| 2139 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2140 | 3,963 | 0 | 0 | 0 | 3,387 | 7,350 |
| 2141 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2142 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2143 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2144 | 3,963 | 0 | 0 | 0 | 3,387 | 7,350 |
| 2145 | 5,471 | 4,556 | 0 | 0 | 3,378 | 13,405 |
| 2146 | 4,965 | 3,037 | 0 | 0 | 3,378 | 11,380 |
| 2147 | 4,965 | 3,037 | 0 | 0 | 3,378 | 11,380 |
| 2148 | 3,963 | 0 | 0 | 0 | 3,387 | 7,350 |
| 2149 | 4,965 | 3,037 | 0 | 0 | 3,378 | 11,380 |
| 2150 | 5,471 | 4,556 | 0 | 0 | 3,378 | 13,405 |
| 2151 | 5,471 | 4,556 | 0 | 0 | 3,378 | 13,405 |
| 2152 | 5,482 | 4,556 | 0 | 0 | 3,387 | 13,425 |

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TABLE 3.7 (continued)
SCENARIO 4: DECON WITH 200 YEAR DFS, UNIT 1
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|------|-------|--------------------------|--------|--------|-------|--------|
| 2153 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2154 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2155 | 5,831 | 5,635 | 0 | 0 | 3,378 | 14,844 |
| 2156 | 4,976 | 3,037 | 0 | 0 | 3,387 | 11,400 |
| 2157 | 4,965 | 3,037 | 0 | 0 | 3,378 | 11,380 |
| 2158 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2159 | 4,965 | 3,037 | 0 | 0 | 3,378 | 11,380 |
| 2160 | 4,976 | 3,037 | 0 | 0 | 3,387 | 11,400 |
| 2161 | 4,965 | 3,037 | 0 | 0 | 3,378 | 11,380 |
| 2162 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2163 | 6,990 | 9,112 | 0 | 0 | 3,378 | 19,480 |
| 2164 | 5,988 | 6,075 | 0 | 0 | 3,387 | 15,450 |
| 2165 | 4,965 | 3,037 | 0 | 0 | 3,378 | 11,380 |
| 2166 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2167 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2168 | 5,988 | 6,075 | 0 | 0 | 3,387 | 15,450 |
| 2169 | 5,471 | 4,556 | 0 | 0 | 3,378 | 13,405 |
| 2170 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2171 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2172 | 6,494 | 7,594 | 0 | 0 | 3,387 | 17,475 |
| 2173 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2174 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2175 | 6,483 | 7,594 | 0 | 0 | 3,378 | 17,455 |
| 2176 | 3,963 | 0 | 0 | 0 | 3,387 | 7,350 |
| 2177 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2178 | 6,483 | 7,594 | 0 | 0 | 3,378 | 17,455 |
| 2179 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2180 | 3,963 | 0 | 0 | 0 | 3,387 | 7,350 |
| 2181 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2182 | 6,483 | 7,594 | 0 | 0 | 3,378 | 17,455 |

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TABLE 3.7 (continued)
SCENARIO 4: DECON WITH 200 YEAR DFS, UNIT 1
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|------|--------|--------------------------|--------|--------|-------|--------|
| 2183 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2184 | 3,963 | 0 | 0 | 0 | 3,387 | 7,350 |
| 2185 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2186 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2187 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2188 | 19,150 | 45,562 | 0 | 0 | 3,387 | 68,099 |
| 2189 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2190 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2191 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2192 | 3,963 | 0 | 0 | 0 | 3,387 | 7,350 |
| 2193 | 4,056 | 311 | 0 | 0 | 3,378 | 7,745 |
| 2194 | 4,212 | 778 | 0 | 0 | 3,378 | 8,368 |
| 2195 | 6,090 | 6,414 | 0 | 0 | 3,378 | 15,881 |
| 2196 | 5,287 | 3,972 | 0 | 0 | 3,387 | 12,645 |
| 2197 | 5,120 | 3,504 | 0 | 0 | 3,378 | 12,002 |
| 2198 | 4,315 | 1,090 | 0 | 0 | 3,378 | 8,783 |
| 2199 | 5,120 | 3,504 | 0 | 0 | 3,378 | 12,002 |
| 2200 | 5,575 | 4,868 | 0 | 0 | 3,378 | 13,820 |
| 2201 | 5,730 | 5,335 | 0 | 0 | 3,378 | 14,443 |
| 2202 | 5,730 | 5,335 | 0 | 0 | 3,378 | 14,443 |
| 2203 | 4,108 | 467 | 0 | 0 | 3,378 | 7,952 |
| 2204 | 4,171 | 623 | 0 | 0 | 3,387 | 8,180 |
| 2205 | 5,679 | 5,179 | 0 | 0 | 3,378 | 14,235 |
| 2206 | 5,120 | 3,504 | 0 | 0 | 3,378 | 12,002 |
| 2207 | 5,172 | 3,660 | 0 | 0 | 3,378 | 12,210 |
| 2208 | 4,171 | 623 | 0 | 0 | 3,387 | 8,180 |
| 2209 | 5,120 | 3,504 | 0 | 0 | 3,378 | 12,002 |
| 2210 | 5,172 | 3,660 | 0 | 0 | 3,378 | 12,210 |
| 2211 | 5,172 | 3,660 | 0 | 0 | 3,378 | 12,210 |
| 2212 | 4,171 | 623 | 0 | 0 | 3,387 | 8,180 |
| 2213 | 7,197 | 9,735 | 0 | 0 | 3,378 | 20,310 |

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TABLE 3.7 (continued)
SCENARIO 4: DECON WITH 200 YEAR DFS, UNIT 1
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|--------------|------------------|--------------------------|---------------|---------------|----------------|------------------|
| 2214 | 6,185 | 6,698 | 0 | 0 | 3,378 | 16,260 |
| 2215 | 5,172 | 3,660 | 0 | 0 | 3,378 | 12,210 |
| 2216 | 4,171 | 623 | 0 | 0 | 3,387 | 8,180 |
| 2217 | 4,134 | 2,428 | 0 | 0 | 13,357 | 19,918 |
| 2218 | 1,124 | 887 | 20 | 177 | 1,957 | 4,164 |
| | | | | | | |
| Total | 1,249,423 | 689,898 | 10,742 | 91,722 | 732,670 | 2,774,456 |

Note: Columns may not add due to rounding

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TABLE 3.8
SCENARIO 4: DECON WITH 200 YEAR DFS, UNIT 2
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|------|--------|--------------------------|--------|--------|--------|---------|
| 2034 | 8,346 | 600 | 327 | 10 | 5,287 | 14,570 |
| 2035 | 49,894 | 6,051 | 2,191 | 2,472 | 28,487 | 89,096 |
| 2036 | 67,674 | 31,946 | 2,409 | 22,189 | 20,301 | 144,519 |
| 2037 | 76,073 | 43,082 | 1,676 | 30,330 | 20,209 | 171,370 |
| 2038 | 82,785 | 48,346 | 1,284 | 36,708 | 18,369 | 187,492 |
| 2039 | 39,073 | 4,749 | 599 | 5,008 | 6,511 | 55,940 |
| 2040 | 24,880 | 10,135 | 253 | 16 | 5,209 | 40,493 |
| 2041 | 18,384 | 14,730 | 186 | 0 | 5,303 | 38,604 |
| 2042 | 10,753 | 6,941 | 88 | 0 | 4,285 | 22,067 |
| 2043 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2044 | 3,963 | 0 | 0 | 0 | 3,387 | 7,350 |
| 2045 | 5,466 | 4,542 | 0 | 0 | 3,378 | 13,386 |
| 2046 | 4,962 | 3,028 | 0 | 0 | 3,378 | 11,367 |
| 2047 | 4,962 | 3,028 | 0 | 0 | 3,378 | 11,367 |
| 2048 | 3,963 | 0 | 0 | 0 | 3,387 | 7,350 |
| 2049 | 4,962 | 3,028 | 0 | 0 | 3,378 | 11,367 |
| 2050 | 5,466 | 4,542 | 0 | 0 | 3,378 | 13,386 |
| 2051 | 5,412 | 4,378 | 0 | 0 | 3,378 | 13,167 |
| 2052 | 5,477 | 4,542 | 0 | 0 | 3,387 | 13,406 |
| 2053 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2054 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2055 | 5,466 | 4,542 | 0 | 0 | 3,378 | 13,386 |
| 2056 | 4,972 | 3,028 | 0 | 0 | 3,387 | 11,388 |
| 2057 | 4,962 | 3,028 | 0 | 0 | 3,378 | 11,367 |
| 2058 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2059 | 4,907 | 2,864 | 0 | 0 | 3,378 | 11,148 |
| 2060 | 4,972 | 3,028 | 0 | 0 | 3,387 | 11,388 |
| 2061 | 4,962 | 3,028 | 0 | 0 | 3,378 | 11,367 |
| 2062 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2063 | 6,980 | 9,085 | 0 | 0 | 3,378 | 19,443 |

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TABLE 3.8 (continued)
SCENARIO 4: DECON WITH 200 YEAR DFS, UNIT 2
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|------|--------|--------------------------|--------|--------|-------|--------|
| 2064 | 5,927 | 5,892 | 0 | 0 | 3,387 | 15,206 |
| 2065 | 4,962 | 3,028 | 0 | 0 | 3,378 | 11,367 |
| 2066 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2067 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2068 | 5,982 | 6,057 | 0 | 0 | 3,387 | 15,425 |
| 2069 | 5,466 | 4,542 | 0 | 0 | 3,378 | 13,386 |
| 2070 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2071 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2072 | 6,432 | 7,406 | 0 | 0 | 3,387 | 17,225 |
| 2073 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2074 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2075 | 6,836 | 8,650 | 0 | 0 | 3,378 | 18,863 |
| 2076 | 3,963 | 0 | 0 | 0 | 3,387 | 7,350 |
| 2077 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2078 | 6,476 | 7,571 | 0 | 0 | 3,378 | 17,424 |
| 2079 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2080 | 3,963 | 0 | 0 | 0 | 3,387 | 7,350 |
| 2081 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2082 | 6,366 | 7,242 | 0 | 0 | 3,378 | 16,986 |
| 2083 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2084 | 3,963 | 0 | 0 | 0 | 3,387 | 7,350 |
| 2085 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2086 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2087 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2088 | 19,160 | 45,618 | 0 | 2,988 | 3,910 | 71,675 |
| 2089 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2090 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2091 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2092 | 3,963 | 0 | 0 | 0 | 3,387 | 7,350 |
| 2093 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |

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TABLE 3.8 (continued)
SCENARIO 4: DECON WITH 200 YEAR DFS, UNIT 2
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|------|-------|--------------------------|--------|--------|-------|--------|
| 2094 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2095 | 5,471 | 4,556 | 0 | 0 | 3,378 | 13,405 |
| 2096 | 4,976 | 3,037 | 0 | 0 | 3,387 | 11,400 |
| 2097 | 4,965 | 3,037 | 0 | 0 | 3,378 | 11,380 |
| 2098 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2099 | 4,965 | 3,037 | 0 | 0 | 3,378 | 11,380 |
| 2100 | 5,471 | 4,556 | 0 | 0 | 3,378 | 13,405 |
| 2101 | 5,471 | 4,556 | 0 | 0 | 3,378 | 13,405 |
| 2102 | 5,471 | 4,556 | 0 | 0 | 3,378 | 13,405 |
| 2103 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2104 | 3,963 | 0 | 0 | 0 | 3,387 | 7,350 |
| 2105 | 5,471 | 4,556 | 0 | 0 | 3,378 | 13,405 |
| 2106 | 4,965 | 3,037 | 0 | 0 | 3,378 | 11,380 |
| 2107 | 4,965 | 3,037 | 0 | 0 | 3,378 | 11,380 |
| 2108 | 3,963 | 0 | 0 | 0 | 3,387 | 7,350 |
| 2109 | 4,965 | 3,037 | 0 | 0 | 3,378 | 11,380 |
| 2110 | 4,965 | 3,037 | 0 | 0 | 3,378 | 11,380 |
| 2111 | 4,965 | 3,037 | 0 | 0 | 3,378 | 11,380 |
| 2112 | 3,963 | 0 | 0 | 0 | 3,387 | 7,350 |
| 2113 | 6,990 | 9,112 | 0 | 0 | 3,378 | 19,480 |
| 2114 | 5,977 | 6,075 | 0 | 0 | 3,378 | 15,430 |
| 2115 | 5,324 | 4,117 | 0 | 0 | 3,378 | 12,819 |
| 2116 | 3,963 | 0 | 0 | 0 | 3,387 | 7,350 |
| 2117 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2118 | 5,977 | 6,075 | 0 | 0 | 3,378 | 15,430 |
| 2119 | 5,471 | 4,556 | 0 | 0 | 3,378 | 13,405 |
| 2120 | 3,963 | 0 | 0 | 0 | 3,387 | 7,350 |
| 2121 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2122 | 6,483 | 7,594 | 0 | 0 | 3,378 | 17,455 |
| 2123 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |

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TABLE 3.8 (continued)
SCENARIO 4: DECON WITH 200 YEAR DFS, UNIT 2
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|------|--------|--------------------------|--------|--------|-------|--------|
| 2124 | 3,963 | 0 | 0 | 0 | 3,387 | 7,350 |
| 2125 | 6,483 | 7,594 | 0 | 0 | 3,378 | 17,455 |
| 2126 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2127 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2128 | 6,494 | 7,594 | 0 | 0 | 3,387 | 17,475 |
| 2129 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2130 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2131 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2132 | 6,494 | 7,594 | 0 | 0 | 3,387 | 17,475 |
| 2133 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2134 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2135 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2136 | 3,963 | 0 | 0 | 0 | 3,387 | 7,350 |
| 2137 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2138 | 19,139 | 45,562 | 0 | 0 | 3,378 | 68,079 |
| 2139 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2140 | 3,963 | 0 | 0 | 0 | 3,387 | 7,350 |
| 2141 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2142 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2143 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2144 | 3,963 | 0 | 0 | 0 | 3,387 | 7,350 |
| 2145 | 5,471 | 4,556 | 0 | 0 | 3,378 | 13,405 |
| 2146 | 4,965 | 3,037 | 0 | 0 | 3,378 | 11,380 |
| 2147 | 4,965 | 3,037 | 0 | 0 | 3,378 | 11,380 |
| 2148 | 3,963 | 0 | 0 | 0 | 3,387 | 7,350 |
| 2149 | 4,965 | 3,037 | 0 | 0 | 3,378 | 11,380 |
| 2150 | 5,471 | 4,556 | 0 | 0 | 3,378 | 13,405 |
| 2151 | 5,471 | 4,556 | 0 | 0 | 3,378 | 13,405 |
| 2152 | 5,482 | 4,556 | 0 | 0 | 3,387 | 13,425 |
| 2153 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |

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TABLE 3.8 (continued)
SCENARIO 4: DECON WITH 200 YEAR DFS, UNIT 2
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|------|-------|--------------------------|--------|--------|-------|--------|
| 2154 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2155 | 5,831 | 5,635 | 0 | 0 | 3,378 | 14,844 |
| 2156 | 4,976 | 3,037 | 0 | 0 | 3,387 | 11,400 |
| 2157 | 4,965 | 3,037 | 0 | 0 | 3,378 | 11,380 |
| 2158 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2159 | 4,965 | 3,037 | 0 | 0 | 3,378 | 11,380 |
| 2160 | 4,976 | 3,037 | 0 | 0 | 3,387 | 11,400 |
| 2161 | 4,965 | 3,037 | 0 | 0 | 3,378 | 11,380 |
| 2162 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2163 | 6,990 | 9,112 | 0 | 0 | 3,378 | 19,480 |
| 2164 | 5,988 | 6,075 | 0 | 0 | 3,387 | 15,450 |
| 2165 | 4,965 | 3,037 | 0 | 0 | 3,378 | 11,380 |
| 2166 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2167 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2168 | 5,988 | 6,075 | 0 | 0 | 3,387 | 15,450 |
| 2169 | 5,471 | 4,556 | 0 | 0 | 3,378 | 13,405 |
| 2170 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2171 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2172 | 6,494 | 7,594 | 0 | 0 | 3,387 | 17,475 |
| 2173 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2174 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2175 | 6,483 | 7,594 | 0 | 0 | 3,378 | 17,455 |
| 2176 | 3,963 | 0 | 0 | 0 | 3,387 | 7,350 |
| 2177 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2178 | 6,483 | 7,594 | 0 | 0 | 3,378 | 17,455 |
| 2179 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2180 | 3,963 | 0 | 0 | 0 | 3,387 | 7,350 |
| 2181 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2182 | 6,483 | 7,594 | 0 | 0 | 3,378 | 17,455 |
| 2183 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |

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TABLE 3.8 (continued)
SCENARIO 4: DECON WITH 200 YEAR DFS, UNIT 2
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|------|--------|--------------------------|--------|--------|-------|--------|
| 2184 | 3,963 | 0 | 0 | 0 | 3,387 | 7,350 |
| 2185 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2186 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2187 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2188 | 19,150 | 45,562 | 0 | 0 | 3,387 | 68,099 |
| 2189 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2190 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2191 | 3,952 | 0 | 0 | 0 | 3,378 | 7,330 |
| 2192 | 3,963 | 0 | 0 | 0 | 3,387 | 7,350 |
| 2193 | 4,056 | 311 | 0 | 0 | 3,378 | 7,745 |
| 2194 | 4,212 | 778 | 0 | 0 | 3,378 | 8,368 |
| 2195 | 6,090 | 6,414 | 0 | 0 | 3,378 | 15,881 |
| 2196 | 5,287 | 3,972 | 0 | 0 | 3,387 | 12,645 |
| 2197 | 5,120 | 3,504 | 0 | 0 | 3,378 | 12,002 |
| 2198 | 4,315 | 1,090 | 0 | 0 | 3,378 | 8,783 |
| 2199 | 5,120 | 3,504 | 0 | 0 | 3,378 | 12,002 |
| 2200 | 5,575 | 4,868 | 0 | 0 | 3,378 | 13,820 |
| 2201 | 5,730 | 5,335 | 0 | 0 | 3,378 | 14,443 |
| 2202 | 5,730 | 5,335 | 0 | 0 | 3,378 | 14,443 |
| 2203 | 4,108 | 467 | 0 | 0 | 3,378 | 7,952 |
| 2204 | 4,171 | 623 | 0 | 0 | 3,387 | 8,180 |
| 2205 | 5,679 | 5,179 | 0 | 0 | 3,378 | 14,235 |
| 2206 | 5,120 | 3,504 | 0 | 0 | 3,378 | 12,002 |
| 2207 | 5,172 | 3,660 | 0 | 0 | 3,378 | 12,210 |
| 2208 | 4,171 | 623 | 0 | 0 | 3,387 | 8,180 |
| 2209 | 5,120 | 3,504 | 0 | 0 | 3,378 | 12,002 |
| 2210 | 5,172 | 3,660 | 0 | 0 | 3,378 | 12,210 |
| 2211 | 5,172 | 3,660 | 0 | 0 | 3,378 | 12,210 |
| 2212 | 4,171 | 623 | 0 | 0 | 3,387 | 8,180 |
| 2213 | 7,197 | 9,735 | 0 | 0 | 3,378 | 20,310 |

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TABLE 3.8 (continued)
SCENARIO 4: DECON WITH 200 YEAR DFS, UNIT 2
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|--------------|------------------|--------------------------|--------------|---------------|----------------|------------------|
| 2214 | 6,185 | 6,698 | 0 | 0 | 3,378 | 16,260 |
| 2215 | 5,172 | 3,660 | 0 | 0 | 3,378 | 12,210 |
| 2216 | 4,171 | 623 | 0 | 0 | 3,387 | 8,180 |
| 2217 | 4,134 | 2,428 | 0 | 0 | 13,357 | 19,918 |
| 2218 | 1,124 | 887 | 20 | 177 | 1,957 | 4,164 |
| | | | | | | |
| Total | 1,250,894 | 708,831 | 9,033 | 99,898 | 717,875 | 2,786,532 |

Note: Columns may not add due to rounding

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TABLE 3.9
SCENARIO 5: SAFSTOR WITH 42 YEAR DFS, UNIT 1
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|------|--------|--------------------------|--------|--------|--------|--------|
| 2033 | 19,045 | 696 | 741 | 25 | 4,394 | 24,901 |
| 2034 | 48,160 | 4,428 | 1,864 | 527 | 26,418 | 81,398 |
| 2035 | 19,428 | 13,608 | 524 | 148 | 16,938 | 50,647 |
| 2036 | 16,303 | 14,592 | 374 | 20 | 17,085 | 48,374 |
| 2037 | 16,258 | 14,552 | 373 | 20 | 17,038 | 48,242 |
| 2038 | 14,281 | 12,057 | 340 | 18 | 15,144 | 41,840 |
| 2039 | 5,186 | 945 | 186 | 11 | 6,235 | 12,563 |
| 2040 | 5,252 | 1,101 | 187 | 11 | 6,252 | 12,803 |
| 2041 | 5,134 | 789 | 186 | 11 | 6,235 | 12,356 |
| 2042 | 5,290 | 1,256 | 186 | 11 | 6,235 | 12,979 |
| 2043 | 5,134 | 789 | 186 | 11 | 6,235 | 12,356 |
| 2044 | 5,096 | 634 | 187 | 11 | 6,252 | 12,180 |
| 2045 | 5,186 | 945 | 186 | 11 | 6,235 | 12,563 |
| 2046 | 5,186 | 945 | 186 | 11 | 6,235 | 12,563 |
| 2047 | 5,134 | 789 | 186 | 11 | 6,235 | 12,356 |
| 2048 | 5,200 | 946 | 187 | 11 | 6,252 | 12,596 |
| 2049 | 5,186 | 945 | 186 | 11 | 6,235 | 12,563 |
| 2050 | 5,134 | 789 | 186 | 11 | 6,235 | 12,356 |
| 2051 | 5,186 | 945 | 186 | 11 | 6,235 | 12,563 |
| 2052 | 5,148 | 790 | 187 | 11 | 6,252 | 12,388 |
| 2053 | 5,082 | 633 | 186 | 11 | 6,235 | 12,148 |
| 2054 | 5,082 | 633 | 186 | 11 | 6,235 | 12,148 |
| 2055 | 5,082 | 633 | 186 | 11 | 6,235 | 12,148 |
| 2056 | 4,992 | 323 | 187 | 11 | 6,252 | 11,765 |
| 2057 | 4,979 | 322 | 186 | 11 | 6,235 | 11,733 |
| 2058 | 4,979 | 322 | 186 | 11 | 6,235 | 11,733 |
| 2059 | 4,979 | 322 | 186 | 11 | 6,235 | 11,733 |
| 2060 | 5,096 | 634 | 187 | 11 | 6,252 | 12,180 |
| 2061 | 5,082 | 633 | 186 | 11 | 6,235 | 12,148 |
| 2062 | 5,082 | 633 | 186 | 11 | 6,235 | 12,148 |

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TABLE 3.9 (continued)
SCENARIO 5: SAFSTOR WITH 42 YEAR DFS, UNIT 1
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|------|--------|--------------------------|--------|--------|--------|---------|
| 2063 | 5,082 | 633 | 186 | 11 | 6,235 | 12,148 |
| 2064 | 5,096 | 634 | 187 | 11 | 6,252 | 12,180 |
| 2065 | 5,082 | 633 | 186 | 11 | 6,235 | 12,148 |
| 2066 | 5,082 | 633 | 186 | 11 | 6,235 | 12,148 |
| 2067 | 5,082 | 633 | 186 | 11 | 6,235 | 12,148 |
| 2068 | 5,096 | 634 | 187 | 11 | 6,252 | 12,180 |
| 2069 | 5,082 | 633 | 186 | 11 | 6,235 | 12,148 |
| 2070 | 5,082 | 633 | 186 | 11 | 6,235 | 12,148 |
| 2071 | 5,082 | 633 | 186 | 11 | 6,235 | 12,148 |
| 2072 | 5,096 | 634 | 187 | 11 | 6,252 | 12,180 |
| 2073 | 5,082 | 633 | 186 | 11 | 6,235 | 12,148 |
| 2074 | 5,082 | 633 | 186 | 11 | 6,235 | 12,148 |
| 2075 | 4,282 | 320 | 186 | 10 | 3,162 | 7,961 |
| 2076 | 4,294 | 321 | 187 | 11 | 3,171 | 7,983 |
| 2077 | 4,282 | 320 | 186 | 10 | 3,162 | 7,961 |
| 2078 | 4,282 | 320 | 186 | 10 | 3,162 | 7,961 |
| 2079 | 4,282 | 320 | 186 | 10 | 3,162 | 7,961 |
| 2080 | 4,294 | 321 | 187 | 11 | 3,171 | 7,983 |
| 2081 | 4,282 | 320 | 186 | 10 | 3,162 | 7,961 |
| 2082 | 4,282 | 320 | 186 | 10 | 3,162 | 7,961 |
| 2083 | 4,282 | 320 | 186 | 10 | 3,162 | 7,961 |
| 2084 | 4,294 | 321 | 187 | 11 | 3,171 | 7,983 |
| 2085 | 4,282 | 320 | 186 | 10 | 3,162 | 7,961 |
| 2086 | 4,282 | 320 | 186 | 10 | 3,162 | 7,961 |
| 2087 | 27,710 | 3,200 | 1,088 | 1,062 | 3,389 | 36,449 |
| 2088 | 49,590 | 7,228 | 1,866 | 2,031 | 4,068 | 64,784 |
| 2089 | 56,167 | 28,002 | 1,771 | 26,522 | 15,816 | 128,280 |
| 2090 | 42,753 | 14,271 | 1,506 | 22,835 | 10,248 | 91,613 |
| 2091 | 37,335 | 8,726 | 1,398 | 21,346 | 8,000 | 76,805 |
| 2092 | 7,675 | 892 | 150 | 1,477 | 2,793 | 12,986 |

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TABLE 3.9 (continued)
SCENARIO 5: SAFSTOR WITH 42 YEAR DFS, UNIT 1
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|--------------|----------------|--------------------------|---------------|---------------|----------------|------------------|
| 2093 | 18,857 | 4,193 | 299 | 28 | 2,367 | 25,743 |
| 2094 | 13,636 | 8,639 | 186 | 0 | 1,922 | 24,384 |
| 2095 | 9,863 | 6,248 | 135 | 0 | 1,390 | 17,636 |
| | | | | | | |
| Total | 632,401 | 170,481 | 21,571 | 76,568 | 409,608 | 1,310,629 |

Note: Columns may not add due to rounding

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TABLE 3.10
SCENARIO 5: SAFSTOR WITH 42 YEAR DFS, UNIT 2
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|------|--------|--------------------------|--------|--------|--------|--------|
| 2034 | 7,648 | 506 | 327 | 11 | 3,559 | 12,051 |
| 2035 | 47,107 | 5,551 | 1,864 | 350 | 27,380 | 82,253 |
| 2036 | 32,232 | 16,816 | 856 | 464 | 19,987 | 70,355 |
| 2037 | 23,188 | 20,952 | 373 | 24 | 15,859 | 60,397 |
| 2038 | 20,005 | 17,338 | 340 | 21 | 14,170 | 51,875 |
| 2039 | 5,242 | 963 | 186 | 11 | 6,223 | 12,626 |
| 2040 | 5,308 | 1,120 | 187 | 11 | 6,240 | 12,865 |
| 2041 | 5,190 | 808 | 186 | 11 | 6,223 | 12,418 |
| 2042 | 5,346 | 1,275 | 186 | 11 | 6,223 | 13,041 |
| 2043 | 5,190 | 808 | 186 | 11 | 6,223 | 12,418 |
| 2044 | 5,152 | 653 | 187 | 11 | 6,240 | 12,243 |
| 2045 | 5,242 | 963 | 186 | 11 | 6,223 | 12,626 |
| 2046 | 5,242 | 963 | 186 | 11 | 6,223 | 12,626 |
| 2047 | 5,190 | 808 | 186 | 11 | 6,223 | 12,418 |
| 2048 | 5,256 | 964 | 187 | 11 | 6,240 | 12,658 |
| 2049 | 5,242 | 963 | 186 | 11 | 6,223 | 12,626 |
| 2050 | 5,190 | 808 | 186 | 11 | 6,223 | 12,418 |
| 2051 | 5,242 | 963 | 186 | 11 | 6,223 | 12,626 |
| 2052 | 5,204 | 809 | 187 | 11 | 6,240 | 12,450 |
| 2053 | 5,138 | 652 | 186 | 11 | 6,223 | 12,210 |
| 2054 | 5,138 | 652 | 186 | 11 | 6,223 | 12,210 |
| 2055 | 5,138 | 652 | 186 | 11 | 6,223 | 12,210 |
| 2056 | 5,048 | 342 | 187 | 11 | 6,240 | 11,828 |
| 2057 | 5,035 | 341 | 186 | 11 | 6,223 | 11,795 |
| 2058 | 5,035 | 341 | 186 | 11 | 6,223 | 11,795 |
| 2059 | 5,035 | 341 | 186 | 11 | 6,223 | 11,795 |
| 2060 | 5,152 | 653 | 187 | 11 | 6,240 | 12,243 |
| 2061 | 5,138 | 652 | 186 | 11 | 6,223 | 12,210 |
| 2062 | 5,138 | 652 | 186 | 11 | 6,223 | 12,210 |
| 2063 | 5,138 | 652 | 186 | 11 | 6,223 | 12,210 |

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TABLE 3.10 (continued)
SCENARIO 5: SAFSTOR WITH 42 YEAR DFS, UNIT 2
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|------|--------|--------------------------|--------|--------|--------|---------|
| 2064 | 5,152 | 653 | 187 | 11 | 6,240 | 12,243 |
| 2065 | 5,138 | 652 | 186 | 11 | 6,223 | 12,210 |
| 2066 | 5,138 | 652 | 186 | 11 | 6,223 | 12,210 |
| 2067 | 5,138 | 652 | 186 | 11 | 6,223 | 12,210 |
| 2068 | 5,152 | 653 | 187 | 11 | 6,240 | 12,243 |
| 2069 | 5,138 | 652 | 186 | 11 | 6,223 | 12,210 |
| 2070 | 5,138 | 652 | 186 | 11 | 6,223 | 12,210 |
| 2071 | 5,138 | 652 | 186 | 11 | 6,223 | 12,210 |
| 2072 | 5,152 | 653 | 187 | 11 | 6,240 | 12,243 |
| 2073 | 5,138 | 652 | 186 | 11 | 6,223 | 12,210 |
| 2074 | 5,138 | 652 | 186 | 11 | 6,223 | 12,210 |
| 2075 | 825 | 333 | 186 | 10 | 3,164 | 4,519 |
| 2076 | 828 | 334 | 187 | 10 | 3,172 | 4,531 |
| 2077 | 825 | 333 | 186 | 10 | 3,164 | 4,519 |
| 2078 | 825 | 333 | 186 | 10 | 3,164 | 4,519 |
| 2079 | 825 | 333 | 186 | 10 | 3,164 | 4,519 |
| 2080 | 828 | 334 | 187 | 10 | 3,172 | 4,531 |
| 2081 | 825 | 333 | 186 | 10 | 3,164 | 4,519 |
| 2082 | 825 | 333 | 186 | 10 | 3,164 | 4,519 |
| 2083 | 825 | 333 | 186 | 10 | 3,164 | 4,519 |
| 2084 | 828 | 334 | 187 | 10 | 3,172 | 4,531 |
| 2085 | 825 | 333 | 186 | 10 | 3,164 | 4,519 |
| 2086 | 825 | 333 | 186 | 10 | 3,164 | 4,519 |
| 2087 | 825 | 333 | 186 | 10 | 3,164 | 4,519 |
| 2088 | 23,101 | 3,334 | 1,447 | 1,478 | 3,367 | 32,727 |
| 2089 | 37,591 | 11,836 | 1,841 | 7,041 | 6,362 | 64,671 |
| 2090 | 56,571 | 29,110 | 1,771 | 25,884 | 15,637 | 128,973 |
| 2091 | 57,872 | 12,950 | 1,427 | 25,648 | 8,617 | 106,515 |
| 2092 | 53,927 | 10,188 | 1,253 | 21,984 | 7,242 | 94,594 |
| 2093 | 23,983 | 6,921 | 299 | 28 | 2,688 | 33,918 |

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TABLE 3.10 (continued)
SCENARIO 5: SAFSTOR WITH 42 YEAR DFS, UNIT 2
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|--------------|----------------|--------------------------|---------------|---------------|----------------|------------------|
| 2094 | 16,407 | 14,975 | 186 | 0 | 3,086 | 34,655 |
| 2095 | 11,867 | 10,832 | 135 | 0 | 2,232 | 25,065 |
| | | | | | | |
| Total | 608,172 | 191,616 | 21,262 | 83,445 | 395,520 | 1,300,015 |

Note: Columns may not add due to rounding

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TABLE 3.11
SCENARIO 6: SAFSTOR WITH 60 YEAR DFS, UNIT 1
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|------|--------|--------------------------|--------|--------|--------|--------|
| 2033 | 19,045 | 696 | 741 | 25 | 4,394 | 24,901 |
| 2034 | 48,160 | 4,428 | 1,864 | 527 | 26,418 | 81,398 |
| 2035 | 19,353 | 13,383 | 524 | 148 | 16,938 | 50,346 |
| 2036 | 16,219 | 14,341 | 374 | 20 | 17,085 | 48,039 |
| 2037 | 16,175 | 14,301 | 373 | 20 | 17,038 | 47,907 |
| 2038 | 14,212 | 11,850 | 340 | 18 | 15,144 | 41,564 |
| 2039 | 4,979 | 322 | 186 | 11 | 6,235 | 11,733 |
| 2040 | 4,992 | 323 | 187 | 11 | 6,252 | 11,765 |
| 2041 | 4,979 | 322 | 186 | 11 | 6,235 | 11,733 |
| 2042 | 4,979 | 322 | 186 | 11 | 6,235 | 11,733 |
| 2043 | 4,979 | 322 | 186 | 11 | 6,235 | 11,733 |
| 2044 | 4,992 | 323 | 187 | 11 | 6,252 | 11,765 |
| 2045 | 4,979 | 322 | 186 | 11 | 6,235 | 11,733 |
| 2046 | 4,979 | 322 | 186 | 11 | 6,235 | 11,733 |
| 2047 | 4,979 | 322 | 186 | 11 | 6,235 | 11,733 |
| 2048 | 4,992 | 323 | 187 | 11 | 6,252 | 11,765 |
| 2049 | 4,979 | 322 | 186 | 11 | 6,235 | 11,733 |
| 2050 | 4,979 | 322 | 186 | 11 | 6,235 | 11,733 |
| 2051 | 4,979 | 322 | 186 | 11 | 6,235 | 11,733 |
| 2052 | 5,096 | 634 | 187 | 11 | 6,252 | 12,180 |
| 2053 | 5,186 | 945 | 186 | 11 | 6,235 | 12,563 |
| 2054 | 5,186 | 945 | 186 | 11 | 6,235 | 12,563 |
| 2055 | 5,238 | 1,100 | 186 | 11 | 6,235 | 12,771 |
| 2056 | 5,148 | 790 | 187 | 11 | 6,252 | 12,388 |
| 2057 | 5,290 | 1,256 | 186 | 11 | 6,235 | 12,978 |
| 2058 | 5,134 | 789 | 186 | 11 | 6,235 | 12,356 |
| 2059 | 5,082 | 633 | 186 | 11 | 6,235 | 12,148 |
| 2060 | 5,200 | 946 | 187 | 11 | 6,252 | 12,595 |
| 2061 | 5,186 | 945 | 186 | 11 | 6,235 | 12,563 |
| 2062 | 5,134 | 789 | 186 | 11 | 6,235 | 12,356 |

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TABLE 3.11 (continued)
SCENARIO 6: SAFSTOR WITH 60 YEAR DFS, UNIT 1
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|------|--------|--------------------------|--------|--------|--------|---------|
| 2063 | 5,186 | 945 | 186 | 11 | 6,235 | 12,563 |
| 2064 | 5,200 | 946 | 187 | 11 | 6,252 | 12,595 |
| 2065 | 5,134 | 789 | 186 | 11 | 6,235 | 12,356 |
| 2066 | 5,186 | 945 | 186 | 11 | 6,235 | 12,563 |
| 2067 | 5,186 | 945 | 186 | 11 | 6,235 | 12,563 |
| 2068 | 5,148 | 790 | 187 | 11 | 6,252 | 12,388 |
| 2069 | 5,186 | 945 | 186 | 11 | 6,235 | 12,563 |
| 2070 | 5,186 | 945 | 186 | 11 | 6,235 | 12,563 |
| 2071 | 5,186 | 945 | 186 | 11 | 6,235 | 12,563 |
| 2072 | 5,200 | 946 | 187 | 11 | 6,252 | 12,595 |
| 2073 | 5,186 | 945 | 186 | 11 | 6,235 | 12,563 |
| 2074 | 5,546 | 2,024 | 186 | 11 | 6,235 | 14,002 |
| 2075 | 5,186 | 945 | 186 | 11 | 6,235 | 12,563 |
| 2076 | 5,200 | 946 | 187 | 11 | 6,252 | 12,595 |
| 2077 | 4,979 | 322 | 186 | 11 | 6,235 | 11,733 |
| 2078 | 4,282 | 320 | 186 | 10 | 3,162 | 7,962 |
| 2079 | 4,282 | 320 | 186 | 10 | 3,162 | 7,962 |
| 2080 | 4,294 | 321 | 187 | 11 | 3,171 | 7,983 |
| 2081 | 4,282 | 320 | 186 | 10 | 3,162 | 7,962 |
| 2082 | 4,282 | 320 | 186 | 10 | 3,162 | 7,962 |
| 2083 | 4,282 | 320 | 186 | 10 | 3,162 | 7,962 |
| 2084 | 4,294 | 321 | 187 | 11 | 3,171 | 7,983 |
| 2085 | 4,282 | 320 | 186 | 10 | 3,162 | 7,962 |
| 2086 | 4,282 | 320 | 186 | 10 | 3,162 | 7,962 |
| 2087 | 27,710 | 3,200 | 1,088 | 1,062 | 3,389 | 36,449 |
| 2088 | 49,590 | 7,228 | 1,866 | 2,031 | 4,068 | 64,784 |
| 2089 | 56,167 | 28,002 | 1,771 | 26,522 | 15,816 | 128,280 |
| 2090 | 42,753 | 14,271 | 1,506 | 22,835 | 10,248 | 91,613 |
| 2091 | 37,335 | 8,726 | 1,398 | 21,346 | 8,000 | 76,805 |
| 2092 | 7,675 | 892 | 150 | 1,477 | 2,793 | 12,986 |

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TABLE 3.11 (continued)
SCENARIO 6: SAFSTOR WITH 60 YEAR DFS, UNIT 1
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|--------------|----------------|--------------------------|---------------|---------------|----------------|------------------|
| 2093 | 18,857 | 4,193 | 299 | 28 | 2,367 | 25,743 |
| 2094 | 13,636 | 8,639 | 186 | 0 | 1,922 | 24,384 |
| 2095 | 9,863 | 6,248 | 135 | 0 | 1,390 | 17,636 |
| | | | | | | |
| Total | 634,853 | 171,565 | 21,571 | 76,569 | 418,836 | 1,323,393 |

Note: Columns may not add due to rounding

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TABLE 3.12
SCENARIO 6: SAFSTOR WITH 60 YEAR DFS, UNIT 2
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|------|--------|--------------------------|--------|--------|--------|--------|
| 2034 | 7,648 | 506 | 327 | 11 | 3,559 | 12,051 |
| 2035 | 47,107 | 5,551 | 1,864 | 350 | 27,380 | 82,253 |
| 2036 | 32,148 | 16,562 | 856 | 464 | 19,987 | 70,018 |
| 2037 | 23,064 | 20,579 | 373 | 24 | 15,859 | 59,899 |
| 2038 | 19,903 | 17,031 | 340 | 21 | 14,170 | 51,465 |
| 2039 | 5,035 | 341 | 186 | 11 | 6,223 | 11,795 |
| 2040 | 5,048 | 342 | 187 | 11 | 6,240 | 11,828 |
| 2041 | 5,035 | 341 | 186 | 11 | 6,223 | 11,795 |
| 2042 | 5,035 | 341 | 186 | 11 | 6,223 | 11,795 |
| 2043 | 5,035 | 341 | 186 | 11 | 6,223 | 11,795 |
| 2044 | 5,048 | 342 | 187 | 11 | 6,240 | 11,828 |
| 2045 | 5,035 | 341 | 186 | 11 | 6,223 | 11,795 |
| 2046 | 5,035 | 341 | 186 | 11 | 6,223 | 11,795 |
| 2047 | 5,035 | 341 | 186 | 11 | 6,223 | 11,795 |
| 2048 | 5,048 | 342 | 187 | 11 | 6,240 | 11,828 |
| 2049 | 5,035 | 341 | 186 | 11 | 6,223 | 11,795 |
| 2050 | 5,035 | 341 | 186 | 11 | 6,223 | 11,795 |
| 2051 | 5,035 | 341 | 186 | 11 | 6,223 | 11,795 |
| 2052 | 5,048 | 342 | 187 | 11 | 6,240 | 11,828 |
| 2053 | 5,138 | 652 | 186 | 11 | 6,223 | 12,210 |
| 2054 | 5,242 | 963 | 186 | 11 | 6,223 | 12,626 |
| 2055 | 5,242 | 963 | 186 | 11 | 6,223 | 12,626 |
| 2056 | 5,308 | 1,120 | 187 | 11 | 6,240 | 12,865 |
| 2057 | 5,190 | 808 | 186 | 11 | 6,223 | 12,418 |
| 2058 | 5,346 | 1,275 | 186 | 11 | 6,223 | 13,041 |
| 2059 | 5,190 | 808 | 186 | 11 | 6,223 | 12,418 |
| 2060 | 5,152 | 653 | 187 | 11 | 6,240 | 12,243 |
| 2061 | 5,242 | 963 | 186 | 11 | 6,223 | 12,626 |
| 2062 | 5,242 | 963 | 186 | 11 | 6,223 | 12,626 |
| 2063 | 5,190 | 808 | 186 | 11 | 6,223 | 12,418 |

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TABLE 3.12 (continued)
SCENARIO 6: SAFSTOR WITH 60 YEAR DFS, UNIT 2
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|------|--------|--------------------------|--------|--------|--------|---------|
| 2064 | 5,256 | 964 | 187 | 11 | 6,240 | 12,658 |
| 2065 | 5,242 | 963 | 186 | 11 | 6,223 | 12,626 |
| 2066 | 5,190 | 808 | 186 | 11 | 6,223 | 12,418 |
| 2067 | 5,242 | 963 | 186 | 11 | 6,223 | 12,626 |
| 2068 | 5,256 | 964 | 187 | 11 | 6,240 | 12,658 |
| 2069 | 5,190 | 808 | 186 | 11 | 6,223 | 12,418 |
| 2070 | 5,242 | 963 | 186 | 11 | 6,223 | 12,626 |
| 2071 | 5,242 | 963 | 186 | 11 | 6,223 | 12,626 |
| 2072 | 5,256 | 964 | 187 | 11 | 6,240 | 12,658 |
| 2073 | 5,242 | 963 | 186 | 11 | 6,223 | 12,626 |
| 2074 | 5,242 | 963 | 186 | 11 | 6,223 | 12,626 |
| 2075 | 5,602 | 2,043 | 186 | 11 | 6,223 | 14,064 |
| 2076 | 5,256 | 964 | 187 | 11 | 6,240 | 12,658 |
| 2077 | 5,242 | 963 | 186 | 11 | 6,223 | 12,626 |
| 2078 | 825 | 333 | 186 | 10 | 3,164 | 4,519 |
| 2079 | 825 | 333 | 186 | 10 | 3,164 | 4,519 |
| 2080 | 828 | 334 | 187 | 10 | 3,172 | 4,531 |
| 2081 | 825 | 333 | 186 | 10 | 3,164 | 4,519 |
| 2082 | 825 | 333 | 186 | 10 | 3,164 | 4,519 |
| 2083 | 825 | 333 | 186 | 10 | 3,164 | 4,519 |
| 2084 | 828 | 334 | 187 | 10 | 3,172 | 4,531 |
| 2085 | 825 | 333 | 186 | 10 | 3,164 | 4,519 |
| 2086 | 825 | 333 | 186 | 10 | 3,164 | 4,519 |
| 2087 | 825 | 333 | 186 | 10 | 3,164 | 4,519 |
| 2088 | 23,101 | 3,334 | 1,447 | 1,478 | 3,368 | 32,727 |
| 2089 | 37,591 | 11,836 | 1,841 | 7,041 | 6,362 | 64,671 |
| 2090 | 56,571 | 29,110 | 1,771 | 25,884 | 15,637 | 128,973 |
| 2091 | 57,872 | 12,950 | 1,427 | 25,648 | 8,617 | 106,515 |
| 2092 | 53,927 | 10,188 | 1,253 | 21,984 | 7,242 | 94,594 |
| 2093 | 23,983 | 6,921 | 299 | 28 | 2,688 | 33,918 |

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TABLE 3.12 (continued)
SCENARIO 6: SAFSTOR WITH 60 YEAR DFS, UNIT 2
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|--------------|----------------|--------------------------|---------------|---------------|----------------|------------------|
| 2094 | 16,407 | 14,975 | 186 | 0 | 3,086 | 34,655 |
| 2095 | 11,867 | 10,832 | 135 | 0 | 2,232 | 25,065 |
| | | | | | | |
| Total | 621,171 | 192,717 | 21,262 | 83,448 | 404,706 | 1,323,303 |

Note: Columns may not add due to rounding

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TABLE 3.13
SCENARIO 7: SAFSTOR WITH 100 YEAR DFS, UNIT 1
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|------|--------|--------------------------|--------|--------|--------|--------|
| 2033 | 19,545 | 696 | 741 | 25 | 4,394 | 25,400 |
| 2034 | 48,890 | 4,345 | 1,864 | 527 | 26,418 | 82,043 |
| 2035 | 15,648 | 2,269 | 524 | 148 | 16,938 | 35,529 |
| 2036 | 11,694 | 763 | 374 | 20 | 17,085 | 29,936 |
| 2037 | 16,619 | 15,634 | 373 | 20 | 17,038 | 49,684 |
| 2038 | 23,866 | 40,813 | 340 | 18 | 15,144 | 80,181 |
| 2039 | 4,979 | 322 | 186 | 11 | 6,235 | 11,733 |
| 2040 | 4,992 | 323 | 187 | 11 | 6,252 | 11,765 |
| 2041 | 4,979 | 322 | 186 | 11 | 6,235 | 11,733 |
| 2042 | 4,979 | 322 | 186 | 11 | 6,235 | 11,733 |
| 2043 | 4,979 | 322 | 186 | 11 | 6,235 | 11,733 |
| 2044 | 4,992 | 323 | 187 | 11 | 6,252 | 11,765 |
| 2045 | 6,493 | 4,864 | 186 | 11 | 6,235 | 17,790 |
| 2046 | 5,988 | 3,350 | 186 | 11 | 6,235 | 15,771 |
| 2047 | 5,988 | 3,350 | 186 | 11 | 6,235 | 15,771 |
| 2048 | 4,992 | 323 | 187 | 11 | 6,252 | 11,765 |
| 2049 | 5,988 | 3,350 | 186 | 11 | 6,235 | 15,771 |
| 2050 | 6,493 | 4,864 | 186 | 11 | 6,235 | 17,790 |
| 2051 | 6,438 | 4,700 | 186 | 11 | 6,235 | 17,571 |
| 2052 | 6,506 | 4,865 | 187 | 11 | 6,252 | 17,822 |
| 2053 | 4,979 | 322 | 186 | 11 | 6,235 | 11,733 |
| 2054 | 4,979 | 322 | 186 | 11 | 6,235 | 11,733 |
| 2055 | 6,493 | 4,864 | 186 | 11 | 6,235 | 17,790 |
| 2056 | 6,002 | 3,351 | 187 | 11 | 6,252 | 15,803 |
| 2057 | 5,988 | 3,350 | 186 | 11 | 6,235 | 15,771 |
| 2058 | 4,979 | 322 | 186 | 11 | 6,235 | 11,733 |
| 2059 | 5,933 | 3,186 | 186 | 11 | 6,235 | 15,552 |
| 2060 | 6,002 | 3,351 | 187 | 11 | 6,252 | 15,803 |
| 2061 | 5,988 | 3,350 | 186 | 11 | 6,235 | 15,771 |
| 2062 | 4,979 | 322 | 186 | 11 | 6,235 | 11,733 |

**Prairie Island Nuclear Generating Plant
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TABLE 3.13 (continued)
SCENARIO 7: SAFSTOR WITH 100 YEAR DFS, UNIT 1
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|------|--------|--------------------------|--------|--------|--------|---------|
| 2063 | 8,007 | 9,407 | 186 | 11 | 6,235 | 23,846 |
| 2064 | 6,956 | 6,215 | 187 | 11 | 6,252 | 19,622 |
| 2065 | 5,988 | 3,350 | 186 | 11 | 6,235 | 15,771 |
| 2066 | 4,979 | 322 | 186 | 11 | 6,235 | 11,733 |
| 2067 | 4,979 | 322 | 186 | 11 | 6,235 | 11,733 |
| 2068 | 7,011 | 6,379 | 187 | 11 | 6,252 | 19,841 |
| 2069 | 6,493 | 4,864 | 186 | 11 | 6,235 | 17,790 |
| 2070 | 4,979 | 322 | 186 | 11 | 6,235 | 11,733 |
| 2071 | 4,979 | 322 | 186 | 11 | 6,235 | 11,733 |
| 2072 | 7,461 | 7,729 | 187 | 11 | 6,252 | 21,640 |
| 2073 | 4,979 | 322 | 186 | 11 | 6,235 | 11,733 |
| 2074 | 4,979 | 322 | 186 | 11 | 6,235 | 11,733 |
| 2075 | 7,862 | 8,972 | 186 | 11 | 6,235 | 23,266 |
| 2076 | 4,992 | 323 | 187 | 11 | 6,252 | 11,765 |
| 2077 | 4,979 | 322 | 186 | 11 | 6,235 | 11,733 |
| 2078 | 7,502 | 7,893 | 186 | 11 | 6,235 | 21,827 |
| 2079 | 4,979 | 322 | 186 | 11 | 6,235 | 11,733 |
| 2080 | 4,992 | 323 | 187 | 11 | 6,252 | 11,765 |
| 2081 | 4,979 | 322 | 186 | 11 | 6,235 | 11,733 |
| 2082 | 7,393 | 7,564 | 186 | 11 | 6,235 | 21,389 |
| 2083 | 4,979 | 322 | 186 | 11 | 6,235 | 11,733 |
| 2084 | 4,992 | 323 | 187 | 11 | 6,252 | 11,765 |
| 2085 | 4,979 | 322 | 186 | 11 | 6,235 | 11,733 |
| 2086 | 4,979 | 322 | 186 | 11 | 6,235 | 11,733 |
| 2087 | 27,646 | 3,201 | 1,088 | 1,062 | 6,520 | 39,517 |
| 2088 | 64,790 | 52,925 | 1,866 | 5,020 | 7,348 | 131,949 |
| 2089 | 57,854 | 29,888 | 1,771 | 26,522 | 11,260 | 127,296 |
| 2090 | 43,227 | 14,760 | 1,506 | 21,569 | 10,138 | 91,201 |
| 2091 | 37,320 | 8,651 | 1,398 | 19,568 | 9,685 | 76,624 |
| 2092 | 7,957 | 887 | 150 | 1,355 | 6,165 | 16,514 |

**Prairie Island Nuclear Generating Plant
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TABLE 3.13 (continued)
SCENARIO 7: SAFSTOR WITH 100 YEAR DFS, UNIT 1
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|--------------|----------------|--------------------------|---------------|---------------|----------------|------------------|
| 2093 | 21,014 | 4,434 | 299 | 28 | 5,681 | 31,456 |
| 2094 | 16,104 | 9,238 | 186 | 0 | 4,973 | 30,502 |
| 2095 | 14,255 | 11,453 | 135 | 0 | 4,548 | 30,391 |
| 2096 | 5,005 | 3,972 | 0 | 0 | 3,448 | 12,424 |
| 2097 | 4,839 | 3,504 | 0 | 0 | 3,439 | 11,782 |
| 2098 | 4,034 | 1,090 | 0 | 0 | 3,439 | 8,563 |
| 2099 | 4,839 | 3,504 | 0 | 0 | 3,439 | 11,782 |
| 2100 | 5,294 | 4,868 | 0 | 0 | 3,439 | 13,600 |
| 2101 | 5,449 | 5,335 | 0 | 0 | 3,439 | 14,222 |
| 2102 | 5,449 | 5,335 | 0 | 0 | 3,439 | 14,222 |
| 2103 | 3,827 | 467 | 0 | 0 | 3,439 | 7,732 |
| 2104 | 3,889 | 623 | 0 | 0 | 3,448 | 7,959 |
| 2105 | 5,397 | 5,179 | 0 | 0 | 3,439 | 14,015 |
| 2106 | 4,839 | 3,504 | 0 | 0 | 3,439 | 11,782 |
| 2107 | 4,891 | 3,660 | 0 | 0 | 3,439 | 11,990 |
| 2108 | 3,889 | 623 | 0 | 0 | 3,448 | 7,959 |
| 2109 | 4,839 | 3,504 | 0 | 0 | 3,439 | 11,782 |
| 2110 | 4,891 | 3,660 | 0 | 0 | 3,439 | 11,990 |
| 2111 | 4,891 | 3,660 | 0 | 0 | 3,439 | 11,990 |
| 2112 | 3,889 | 623 | 0 | 0 | 3,448 | 7,959 |
| 2113 | 6,916 | 9,735 | 0 | 0 | 3,439 | 20,090 |
| 2114 | 5,904 | 6,698 | 0 | 0 | 3,439 | 16,040 |
| 2115 | 5,251 | 4,739 | 0 | 0 | 3,439 | 13,429 |
| 2116 | 3,889 | 623 | 0 | 0 | 3,448 | 7,959 |
| 2117 | 3,853 | 2,428 | 0 | 0 | 13,415 | 19,696 |
| 2118 | 1,124 | 887 | 20 | 177 | 1,957 | 4,164 |
| | | | | | | |
| Total | 808,018 | 399,730 | 21,590 | 76,570 | 550,465 | 1,856,374 |

Note: Columns may not add due to rounding

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TABLE 3.14
SCENARIO 7: SAFSTOR WITH 100 YEAR DFS, UNIT 2
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|------|--------|--------------------------|--------|--------|--------|--------|
| 2034 | 7,675 | 305 | 327 | 11 | 3,559 | 11,877 |
| 2035 | 47,508 | 5,797 | 1,864 | 350 | 27,380 | 82,899 |
| 2036 | 27,600 | 3,076 | 856 | 464 | 19,987 | 51,983 |
| 2037 | 21,435 | 15,692 | 373 | 24 | 15,859 | 53,383 |
| 2038 | 27,847 | 40,864 | 340 | 21 | 14,170 | 83,243 |
| 2039 | 5,035 | 341 | 186 | 11 | 6,223 | 11,795 |
| 2040 | 5,048 | 342 | 187 | 11 | 6,240 | 11,828 |
| 2041 | 5,035 | 341 | 186 | 11 | 6,223 | 11,795 |
| 2042 | 5,035 | 341 | 186 | 11 | 6,223 | 11,795 |
| 2043 | 5,035 | 341 | 186 | 11 | 6,223 | 11,795 |
| 2044 | 5,048 | 342 | 187 | 11 | 6,240 | 11,828 |
| 2045 | 6,549 | 4,883 | 186 | 11 | 6,223 | 17,852 |
| 2046 | 6,044 | 3,369 | 186 | 11 | 6,223 | 15,833 |
| 2047 | 6,044 | 3,369 | 186 | 11 | 6,223 | 15,833 |
| 2048 | 5,048 | 342 | 187 | 11 | 6,240 | 11,828 |
| 2049 | 6,044 | 3,369 | 186 | 11 | 6,223 | 15,833 |
| 2050 | 6,549 | 4,883 | 186 | 11 | 6,223 | 17,852 |
| 2051 | 6,494 | 4,719 | 186 | 11 | 6,223 | 17,633 |
| 2052 | 6,562 | 4,884 | 187 | 11 | 6,240 | 17,884 |
| 2053 | 5,035 | 341 | 186 | 11 | 6,223 | 11,795 |
| 2054 | 5,035 | 341 | 186 | 11 | 6,223 | 11,795 |
| 2055 | 6,549 | 4,883 | 186 | 11 | 6,223 | 17,852 |
| 2056 | 6,058 | 3,370 | 187 | 11 | 6,240 | 15,865 |
| 2057 | 6,044 | 3,369 | 186 | 11 | 6,223 | 15,833 |
| 2058 | 5,035 | 341 | 186 | 11 | 6,223 | 11,795 |
| 2059 | 5,989 | 3,205 | 186 | 11 | 6,223 | 15,614 |
| 2060 | 6,058 | 3,370 | 187 | 11 | 6,240 | 15,865 |
| 2061 | 6,044 | 3,369 | 186 | 11 | 6,223 | 15,833 |
| 2062 | 5,035 | 341 | 186 | 11 | 6,223 | 11,795 |
| 2063 | 8,063 | 9,426 | 186 | 11 | 6,223 | 23,908 |

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TABLE 3.14 (continued)
SCENARIO 7: SAFSTOR WITH 100 YEAR DFS, UNIT 2
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|------|--------|--------------------------|--------|--------|--------|---------|
| 2064 | 7,012 | 6,234 | 187 | 11 | 6,240 | 19,684 |
| 2065 | 6,044 | 3,369 | 186 | 11 | 6,223 | 15,833 |
| 2066 | 5,035 | 341 | 186 | 11 | 6,223 | 11,795 |
| 2067 | 5,035 | 341 | 186 | 11 | 6,223 | 11,795 |
| 2068 | 7,067 | 6,398 | 187 | 11 | 6,240 | 19,903 |
| 2069 | 6,549 | 4,883 | 186 | 11 | 6,223 | 17,852 |
| 2070 | 5,035 | 341 | 186 | 11 | 6,223 | 11,795 |
| 2071 | 5,035 | 341 | 186 | 11 | 6,223 | 11,795 |
| 2072 | 7,517 | 7,748 | 187 | 11 | 6,240 | 21,703 |
| 2073 | 5,035 | 341 | 186 | 11 | 6,223 | 11,795 |
| 2074 | 5,035 | 341 | 186 | 11 | 6,223 | 11,795 |
| 2075 | 7,918 | 8,991 | 186 | 11 | 6,223 | 23,329 |
| 2076 | 5,048 | 342 | 187 | 11 | 6,240 | 11,828 |
| 2077 | 5,035 | 341 | 186 | 11 | 6,223 | 11,795 |
| 2078 | 7,558 | 7,911 | 186 | 11 | 6,223 | 21,890 |
| 2079 | 5,035 | 341 | 186 | 11 | 6,223 | 11,795 |
| 2080 | 5,048 | 342 | 187 | 11 | 6,240 | 11,828 |
| 2081 | 5,035 | 341 | 186 | 11 | 6,223 | 11,795 |
| 2082 | 7,449 | 7,583 | 186 | 11 | 6,223 | 21,451 |
| 2083 | 5,035 | 341 | 186 | 11 | 6,223 | 11,795 |
| 2084 | 5,048 | 342 | 187 | 11 | 6,240 | 11,828 |
| 2085 | 5,035 | 341 | 186 | 11 | 6,223 | 11,795 |
| 2086 | 5,035 | 341 | 186 | 11 | 6,223 | 11,795 |
| 2087 | 5,035 | 341 | 186 | 11 | 6,223 | 11,795 |
| 2088 | 38,955 | 48,954 | 1,447 | 4,466 | 7,047 | 100,869 |
| 2089 | 37,814 | 12,311 | 1,841 | 7,041 | 7,480 | 66,488 |
| 2090 | 57,989 | 30,995 | 1,771 | 25,884 | 11,081 | 127,720 |
| 2091 | 59,766 | 13,027 | 1,427 | 24,007 | 9,822 | 108,049 |
| 2092 | 55,869 | 10,125 | 1,253 | 20,460 | 9,192 | 96,899 |
| 2093 | 26,140 | 7,163 | 299 | 28 | 6,002 | 39,632 |

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TABLE 3.14 (continued)
SCENARIO 7: SAFSTOR WITH 100 YEAR DFS, UNIT 2
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|--------------|----------------|--------------------------|---------------|---------------|----------------|------------------|
| 2094 | 18,875 | 15,575 | 186 | 0 | 6,136 | 40,773 |
| 2095 | 16,259 | 16,037 | 135 | 0 | 5,390 | 37,820 |
| 2096 | 5,005 | 3,972 | 0 | 0 | 3,448 | 12,424 |
| 2097 | 4,839 | 3,504 | 0 | 0 | 3,439 | 11,782 |
| 2098 | 4,034 | 1,090 | 0 | 0 | 3,439 | 8,563 |
| 2099 | 4,839 | 3,504 | 0 | 0 | 3,439 | 11,782 |
| 2100 | 5,294 | 4,868 | 0 | 0 | 3,439 | 13,600 |
| 2101 | 5,449 | 5,335 | 0 | 0 | 3,439 | 14,222 |
| 2102 | 5,449 | 5,335 | 0 | 0 | 3,439 | 14,222 |
| 2103 | 3,827 | 467 | 0 | 0 | 3,439 | 7,732 |
| 2104 | 3,889 | 623 | 0 | 0 | 3,448 | 7,959 |
| 2105 | 5,397 | 5,179 | 0 | 0 | 3,439 | 14,015 |
| 2106 | 4,839 | 3,504 | 0 | 0 | 3,439 | 11,782 |
| 2107 | 4,891 | 3,660 | 0 | 0 | 3,439 | 11,990 |
| 2108 | 3,889 | 623 | 0 | 0 | 3,448 | 7,959 |
| 2109 | 4,839 | 3,504 | 0 | 0 | 3,439 | 11,782 |
| 2110 | 4,891 | 3,660 | 0 | 0 | 3,439 | 11,990 |
| 2111 | 4,891 | 3,660 | 0 | 0 | 3,439 | 11,990 |
| 2112 | 3,889 | 623 | 0 | 0 | 3,448 | 7,959 |
| 2113 | 6,916 | 9,735 | 0 | 0 | 3,439 | 20,090 |
| 2114 | 5,904 | 6,698 | 0 | 0 | 3,439 | 16,040 |
| 2115 | 5,251 | 4,739 | 0 | 0 | 3,439 | 13,429 |
| 2116 | 3,889 | 623 | 0 | 0 | 3,448 | 7,959 |
| 2117 | 3,853 | 2,428 | 0 | 0 | 13,415 | 19,696 |
| 2118 | 1,124 | 887 | 20 | 177 | 1,957 | 4,164 |
| | | | | | | |
| Total | 833,039 | 420,929 | 21,282 | 83,454 | 535,865 | 1,894,569 |

Note: Columns may not add due to rounding

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TABLE 3.15
SCENARIO 8: SAFSTOR WITH 200 YEAR DFS, UNIT 1
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|------|--------|--------------------------|--------|--------|--------|--------|
| 2033 | 19,545 | 696 | 741 | 25 | 4,394 | 25,400 |
| 2034 | 48,890 | 4,345 | 1,864 | 527 | 26,418 | 82,043 |
| 2035 | 15,648 | 2,269 | 524 | 148 | 16,938 | 35,529 |
| 2036 | 11,694 | 763 | 374 | 20 | 17,085 | 29,936 |
| 2037 | 16,619 | 15,634 | 373 | 20 | 17,038 | 49,684 |
| 2038 | 23,866 | 40,813 | 340 | 18 | 15,144 | 80,181 |
| 2039 | 4,979 | 322 | 186 | 11 | 6,235 | 11,733 |
| 2040 | 4,992 | 323 | 187 | 11 | 6,252 | 11,765 |
| 2041 | 4,979 | 322 | 186 | 11 | 6,235 | 11,733 |
| 2042 | 4,979 | 322 | 186 | 11 | 6,235 | 11,733 |
| 2043 | 4,979 | 322 | 186 | 11 | 6,235 | 11,733 |
| 2044 | 4,992 | 323 | 187 | 11 | 6,252 | 11,765 |
| 2045 | 6,493 | 4,864 | 186 | 11 | 6,235 | 17,790 |
| 2046 | 5,988 | 3,350 | 186 | 11 | 6,235 | 15,771 |
| 2047 | 5,988 | 3,350 | 186 | 11 | 6,235 | 15,771 |
| 2048 | 4,992 | 323 | 187 | 11 | 6,252 | 11,765 |
| 2049 | 5,988 | 3,350 | 186 | 11 | 6,235 | 15,771 |
| 2050 | 6,493 | 4,864 | 186 | 11 | 6,235 | 17,790 |
| 2051 | 6,438 | 4,700 | 186 | 11 | 6,235 | 17,571 |
| 2052 | 6,506 | 4,865 | 187 | 11 | 6,252 | 17,822 |
| 2053 | 4,979 | 322 | 186 | 11 | 6,235 | 11,733 |
| 2054 | 4,979 | 322 | 186 | 11 | 6,235 | 11,733 |
| 2055 | 6,493 | 4,864 | 186 | 11 | 6,235 | 17,790 |
| 2056 | 6,002 | 3,351 | 187 | 11 | 6,252 | 15,803 |
| 2057 | 5,988 | 3,350 | 186 | 11 | 6,235 | 15,771 |
| 2058 | 4,979 | 322 | 186 | 11 | 6,235 | 11,733 |
| 2059 | 5,933 | 3,186 | 186 | 11 | 6,235 | 15,552 |
| 2060 | 6,002 | 3,351 | 187 | 11 | 6,252 | 15,803 |
| 2061 | 5,988 | 3,350 | 186 | 11 | 6,235 | 15,771 |
| 2062 | 4,979 | 322 | 186 | 11 | 6,235 | 11,733 |

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TABLE 3.15 (continued)
SCENARIO 8: SAFSTOR WITH 200 YEAR DFS, UNIT 1
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|------|--------|--------------------------|--------|--------|--------|---------|
| 2063 | 8,007 | 9,407 | 186 | 11 | 6,235 | 23,846 |
| 2064 | 6,956 | 6,215 | 187 | 11 | 6,252 | 19,622 |
| 2065 | 5,988 | 3,350 | 186 | 11 | 6,235 | 15,771 |
| 2066 | 4,979 | 322 | 186 | 11 | 6,235 | 11,733 |
| 2067 | 4,979 | 322 | 186 | 11 | 6,235 | 11,733 |
| 2068 | 7,011 | 6,379 | 187 | 11 | 6,252 | 19,841 |
| 2069 | 6,493 | 4,864 | 186 | 11 | 6,235 | 17,790 |
| 2070 | 4,979 | 322 | 186 | 11 | 6,235 | 11,733 |
| 2071 | 4,979 | 322 | 186 | 11 | 6,235 | 11,733 |
| 2072 | 7,461 | 7,729 | 187 | 11 | 6,252 | 21,640 |
| 2073 | 4,979 | 322 | 186 | 11 | 6,235 | 11,733 |
| 2074 | 4,979 | 322 | 186 | 11 | 6,235 | 11,733 |
| 2075 | 7,862 | 8,972 | 186 | 11 | 6,235 | 23,266 |
| 2076 | 4,992 | 323 | 187 | 11 | 6,252 | 11,765 |
| 2077 | 4,979 | 322 | 186 | 11 | 6,235 | 11,733 |
| 2078 | 7,502 | 7,893 | 186 | 11 | 6,235 | 21,827 |
| 2079 | 4,979 | 322 | 186 | 11 | 6,235 | 11,733 |
| 2080 | 4,992 | 323 | 187 | 11 | 6,252 | 11,765 |
| 2081 | 4,979 | 322 | 186 | 11 | 6,235 | 11,733 |
| 2082 | 7,393 | 7,564 | 186 | 11 | 6,235 | 21,389 |
| 2083 | 4,979 | 322 | 186 | 11 | 6,235 | 11,733 |
| 2084 | 4,992 | 323 | 187 | 11 | 6,252 | 11,765 |
| 2085 | 4,979 | 322 | 186 | 11 | 6,235 | 11,733 |
| 2086 | 4,979 | 322 | 186 | 11 | 6,235 | 11,733 |
| 2087 | 27,646 | 3,201 | 1,088 | 1,062 | 6,473 | 39,471 |
| 2088 | 64,790 | 52,925 | 1,866 | 5,020 | 7,262 | 131,862 |
| 2089 | 57,854 | 29,888 | 1,771 | 26,522 | 11,174 | 127,210 |
| 2090 | 43,227 | 14,760 | 1,506 | 21,569 | 10,052 | 91,115 |
| 2091 | 37,320 | 8,651 | 1,398 | 19,568 | 9,599 | 76,538 |
| 2092 | 7,957 | 887 | 150 | 1,355 | 6,078 | 16,428 |

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TABLE 3.15 (continued)
SCENARIO 8: SAFSTOR WITH 200 YEAR DFS, UNIT 1
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|------|--------|--------------------------|--------|--------|-------|--------|
| 2093 | 20,910 | 4,123 | 299 | 28 | 5,612 | 30,972 |
| 2094 | 15,845 | 8,460 | 186 | 0 | 4,930 | 29,421 |
| 2095 | 13,995 | 10,675 | 135 | 0 | 4,502 | 29,307 |
| 2096 | 4,694 | 3,037 | 0 | 0 | 3,392 | 11,123 |
| 2097 | 4,684 | 3,037 | 0 | 0 | 3,383 | 11,104 |
| 2098 | 3,671 | 0 | 0 | 0 | 3,383 | 7,054 |
| 2099 | 4,684 | 3,037 | 0 | 0 | 3,383 | 11,104 |
| 2100 | 5,190 | 4,556 | 0 | 0 | 3,383 | 13,129 |
| 2101 | 5,190 | 4,556 | 0 | 0 | 3,383 | 13,129 |
| 2102 | 5,190 | 4,556 | 0 | 0 | 3,383 | 13,129 |
| 2103 | 3,671 | 0 | 0 | 0 | 3,383 | 7,054 |
| 2104 | 3,681 | 0 | 0 | 0 | 3,392 | 7,073 |
| 2105 | 5,190 | 4,556 | 0 | 0 | 3,383 | 13,129 |
| 2106 | 4,684 | 3,037 | 0 | 0 | 3,383 | 11,104 |
| 2107 | 4,684 | 3,037 | 0 | 0 | 3,383 | 11,104 |
| 2108 | 3,681 | 0 | 0 | 0 | 3,392 | 7,073 |
| 2109 | 4,684 | 3,037 | 0 | 0 | 3,383 | 11,104 |
| 2110 | 4,684 | 3,037 | 0 | 0 | 3,383 | 11,104 |
| 2111 | 4,684 | 3,037 | 0 | 0 | 3,383 | 11,104 |
| 2112 | 3,681 | 0 | 0 | 0 | 3,392 | 7,073 |
| 2113 | 6,709 | 9,112 | 0 | 0 | 3,383 | 19,204 |
| 2114 | 5,696 | 6,075 | 0 | 0 | 3,383 | 15,154 |
| 2115 | 5,043 | 4,117 | 0 | 0 | 3,383 | 12,543 |
| 2116 | 3,681 | 0 | 0 | 0 | 3,392 | 7,073 |
| 2117 | 3,671 | 0 | 0 | 0 | 3,383 | 7,054 |
| 2118 | 5,696 | 6,075 | 0 | 0 | 3,383 | 15,154 |
| 2119 | 5,190 | 4,556 | 0 | 0 | 3,383 | 13,129 |
| 2120 | 3,681 | 0 | 0 | 0 | 3,392 | 7,073 |
| 2121 | 3,671 | 0 | 0 | 0 | 3,383 | 7,054 |
| 2122 | 6,202 | 7,594 | 0 | 0 | 3,383 | 17,179 |

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TABLE 3.15 (continued)
SCENARIO 8: SAFSTOR WITH 200 YEAR DFS, UNIT 1
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|------|--------|--------------------------|--------|--------|-------|--------|
| 2123 | 3,671 | 0 | 0 | 0 | 3,383 | 7,054 |
| 2124 | 3,681 | 0 | 0 | 0 | 3,392 | 7,073 |
| 2125 | 6,202 | 7,594 | 0 | 0 | 3,383 | 17,179 |
| 2126 | 3,671 | 0 | 0 | 0 | 3,383 | 7,054 |
| 2127 | 3,671 | 0 | 0 | 0 | 3,383 | 7,054 |
| 2128 | 6,212 | 7,594 | 0 | 0 | 3,392 | 17,198 |
| 2129 | 3,671 | 0 | 0 | 0 | 3,383 | 7,054 |
| 2130 | 3,671 | 0 | 0 | 0 | 3,383 | 7,054 |
| 2131 | 3,671 | 0 | 0 | 0 | 3,383 | 7,054 |
| 2132 | 6,212 | 7,594 | 0 | 0 | 3,392 | 17,198 |
| 2133 | 3,671 | 0 | 0 | 0 | 3,383 | 7,054 |
| 2134 | 3,671 | 0 | 0 | 0 | 3,383 | 7,054 |
| 2135 | 3,671 | 0 | 0 | 0 | 3,383 | 7,054 |
| 2136 | 3,681 | 0 | 0 | 0 | 3,392 | 7,073 |
| 2137 | 3,671 | 0 | 0 | 0 | 3,383 | 7,054 |
| 2138 | 18,858 | 45,562 | 0 | 0 | 3,383 | 67,803 |
| 2139 | 3,671 | 0 | 0 | 0 | 3,383 | 7,054 |
| 2140 | 3,681 | 0 | 0 | 0 | 3,392 | 7,073 |
| 2141 | 3,671 | 0 | 0 | 0 | 3,383 | 7,054 |
| 2142 | 3,671 | 0 | 0 | 0 | 3,383 | 7,054 |
| 2143 | 3,671 | 0 | 0 | 0 | 3,383 | 7,054 |
| 2144 | 3,681 | 0 | 0 | 0 | 3,392 | 7,073 |
| 2145 | 5,190 | 4,556 | 0 | 0 | 3,383 | 13,129 |
| 2146 | 4,684 | 3,037 | 0 | 0 | 3,383 | 11,104 |
| 2147 | 4,684 | 3,037 | 0 | 0 | 3,383 | 11,104 |
| 2148 | 3,681 | 0 | 0 | 0 | 3,392 | 7,073 |
| 2149 | 4,684 | 3,037 | 0 | 0 | 3,383 | 11,104 |
| 2150 | 5,190 | 4,556 | 0 | 0 | 3,383 | 13,129 |
| 2151 | 5,190 | 4,556 | 0 | 0 | 3,383 | 13,129 |
| 2152 | 5,200 | 4,556 | 0 | 0 | 3,392 | 13,148 |

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TABLE 3.15 (continued)
SCENARIO 8: SAFSTOR WITH 200 YEAR DFS, UNIT 1
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|------|-------|--------------------------|--------|--------|-------|--------|
| 2153 | 3,671 | 0 | 0 | 0 | 3,383 | 7,054 |
| 2154 | 3,671 | 0 | 0 | 0 | 3,383 | 7,054 |
| 2155 | 5,550 | 5,635 | 0 | 0 | 3,383 | 14,568 |
| 2156 | 4,694 | 3,037 | 0 | 0 | 3,392 | 11,123 |
| 2157 | 4,684 | 3,037 | 0 | 0 | 3,383 | 11,104 |
| 2158 | 3,671 | 0 | 0 | 0 | 3,383 | 7,054 |
| 2159 | 4,684 | 3,037 | 0 | 0 | 3,383 | 11,104 |
| 2160 | 4,694 | 3,037 | 0 | 0 | 3,392 | 11,123 |
| 2161 | 4,684 | 3,037 | 0 | 0 | 3,383 | 11,104 |
| 2162 | 3,671 | 0 | 0 | 0 | 3,383 | 7,054 |
| 2163 | 6,709 | 9,112 | 0 | 0 | 3,383 | 19,204 |
| 2164 | 5,706 | 6,075 | 0 | 0 | 3,392 | 15,173 |
| 2165 | 4,684 | 3,037 | 0 | 0 | 3,383 | 11,104 |
| 2166 | 3,671 | 0 | 0 | 0 | 3,383 | 7,054 |
| 2167 | 3,671 | 0 | 0 | 0 | 3,383 | 7,054 |
| 2168 | 5,706 | 6,075 | 0 | 0 | 3,392 | 15,173 |
| 2169 | 5,190 | 4,556 | 0 | 0 | 3,383 | 13,129 |
| 2170 | 3,671 | 0 | 0 | 0 | 3,383 | 7,054 |
| 2171 | 3,671 | 0 | 0 | 0 | 3,383 | 7,054 |
| 2172 | 6,212 | 7,594 | 0 | 0 | 3,392 | 17,198 |
| 2173 | 3,671 | 0 | 0 | 0 | 3,383 | 7,054 |
| 2174 | 3,671 | 0 | 0 | 0 | 3,383 | 7,054 |
| 2175 | 6,202 | 7,594 | 0 | 0 | 3,383 | 17,179 |
| 2176 | 3,681 | 0 | 0 | 0 | 3,392 | 7,073 |
| 2177 | 3,671 | 0 | 0 | 0 | 3,383 | 7,054 |
| 2178 | 6,202 | 7,594 | 0 | 0 | 3,383 | 17,179 |
| 2179 | 3,671 | 0 | 0 | 0 | 3,383 | 7,054 |
| 2180 | 3,681 | 0 | 0 | 0 | 3,392 | 7,073 |
| 2181 | 3,671 | 0 | 0 | 0 | 3,383 | 7,054 |
| 2182 | 6,202 | 7,594 | 0 | 0 | 3,383 | 17,179 |

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TABLE 3.15 (continued)
SCENARIO 8: SAFSTOR WITH 200 YEAR DFS, UNIT 1
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|------|--------|--------------------------|--------|--------|-------|--------|
| 2183 | 3,671 | 0 | 0 | 0 | 3,383 | 7,054 |
| 2184 | 3,681 | 0 | 0 | 0 | 3,392 | 7,073 |
| 2185 | 3,671 | 0 | 0 | 0 | 3,383 | 7,054 |
| 2186 | 3,671 | 0 | 0 | 0 | 3,383 | 7,054 |
| 2187 | 3,671 | 0 | 0 | 0 | 3,383 | 7,054 |
| 2188 | 18,868 | 45,562 | 0 | 0 | 3,392 | 67,822 |
| 2189 | 3,671 | 0 | 0 | 0 | 3,383 | 7,054 |
| 2190 | 3,671 | 0 | 0 | 0 | 3,383 | 7,054 |
| 2191 | 3,671 | 0 | 0 | 0 | 3,383 | 7,054 |
| 2192 | 3,681 | 0 | 0 | 0 | 3,392 | 7,073 |
| 2193 | 3,775 | 311 | 0 | 0 | 3,383 | 7,469 |
| 2194 | 3,931 | 778 | 0 | 0 | 3,383 | 8,092 |
| 2195 | 5,809 | 6,414 | 0 | 0 | 3,383 | 15,606 |
| 2196 | 5,005 | 3,972 | 0 | 0 | 3,392 | 12,369 |
| 2197 | 4,839 | 3,504 | 0 | 0 | 3,383 | 11,727 |
| 2198 | 4,034 | 1,090 | 0 | 0 | 3,383 | 8,507 |
| 2199 | 4,839 | 3,504 | 0 | 0 | 3,383 | 11,727 |
| 2200 | 5,294 | 4,868 | 0 | 0 | 3,383 | 13,544 |
| 2201 | 5,449 | 5,335 | 0 | 0 | 3,383 | 14,167 |
| 2202 | 5,449 | 5,335 | 0 | 0 | 3,383 | 14,167 |
| 2203 | 3,827 | 467 | 0 | 0 | 3,383 | 7,677 |
| 2204 | 3,889 | 623 | 0 | 0 | 3,392 | 7,904 |
| 2205 | 5,397 | 5,179 | 0 | 0 | 3,383 | 13,959 |
| 2206 | 4,839 | 3,504 | 0 | 0 | 3,383 | 11,727 |
| 2207 | 4,891 | 3,660 | 0 | 0 | 3,383 | 11,934 |
| 2208 | 3,889 | 623 | 0 | 0 | 3,392 | 7,904 |
| 2209 | 4,839 | 3,504 | 0 | 0 | 3,383 | 11,727 |
| 2210 | 4,891 | 3,660 | 0 | 0 | 3,383 | 11,934 |
| 2211 | 4,891 | 3,660 | 0 | 0 | 3,383 | 11,934 |
| 2212 | 3,889 | 623 | 0 | 0 | 3,392 | 7,904 |

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TABLE 3.15 (continued)
SCENARIO 8: SAFSTOR WITH 200 YEAR DFS, UNIT 1
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|--------------|------------------|--------------------------|---------------|---------------|----------------|------------------|
| 2213 | 6,916 | 9,735 | 0 | 0 | 3,383 | 20,034 |
| 2214 | 5,904 | 6,698 | 0 | 0 | 3,383 | 15,984 |
| 2215 | 4,891 | 3,660 | 0 | 0 | 3,383 | 11,934 |
| 2216 | 3,889 | 623 | 0 | 0 | 3,392 | 7,904 |
| 2217 | 3,853 | 2,428 | 0 | 0 | 13,362 | 19,642 |
| 2218 | 1,124 | 887 | 20 | 177 | 1,957 | 4,164 |
| | | | | | | |
| Total | 1,277,333 | 705,634 | 21,590 | 76,570 | 887,128 | 2,968,256 |

Note: Columns may not add due to rounding

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TABLE 3.16
SCENARIO 8: SAFSTOR WITH 200 YEAR DFS, UNIT 2
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|------|--------|--------------------------|--------|--------|--------|--------|
| 2034 | 7,675 | 305 | 327 | 11 | 3,559 | 11,877 |
| 2035 | 47,508 | 5,797 | 1,864 | 350 | 27,380 | 82,899 |
| 2036 | 27,600 | 3,076 | 856 | 464 | 19,987 | 51,983 |
| 2037 | 21,435 | 15,692 | 373 | 24 | 15,859 | 53,383 |
| 2038 | 27,847 | 40,864 | 340 | 21 | 14,170 | 83,243 |
| 2039 | 5,035 | 341 | 186 | 11 | 6,223 | 11,795 |
| 2040 | 5,048 | 342 | 187 | 11 | 6,240 | 11,828 |
| 2041 | 5,035 | 341 | 186 | 11 | 6,223 | 11,795 |
| 2042 | 5,035 | 341 | 186 | 11 | 6,223 | 11,795 |
| 2043 | 5,035 | 341 | 186 | 11 | 6,223 | 11,795 |
| 2044 | 5,048 | 342 | 187 | 11 | 6,240 | 11,828 |
| 2045 | 6,549 | 4,883 | 186 | 11 | 6,223 | 17,852 |
| 2046 | 6,044 | 3,369 | 186 | 11 | 6,223 | 15,833 |
| 2047 | 6,044 | 3,369 | 186 | 11 | 6,223 | 15,833 |
| 2048 | 5,048 | 342 | 187 | 11 | 6,240 | 11,828 |
| 2049 | 6,044 | 3,369 | 186 | 11 | 6,223 | 15,833 |
| 2050 | 6,549 | 4,883 | 186 | 11 | 6,223 | 17,852 |
| 2051 | 6,494 | 4,719 | 186 | 11 | 6,223 | 17,633 |
| 2052 | 6,562 | 4,884 | 187 | 11 | 6,240 | 17,884 |
| 2053 | 5,035 | 341 | 186 | 11 | 6,223 | 11,795 |
| 2054 | 5,035 | 341 | 186 | 11 | 6,223 | 11,795 |
| 2055 | 6,549 | 4,883 | 186 | 11 | 6,223 | 17,852 |
| 2056 | 6,058 | 3,370 | 187 | 11 | 6,240 | 15,865 |
| 2057 | 6,044 | 3,369 | 186 | 11 | 6,223 | 15,833 |
| 2058 | 5,035 | 341 | 186 | 11 | 6,223 | 11,795 |
| 2059 | 5,989 | 3,205 | 186 | 11 | 6,223 | 15,614 |
| 2060 | 6,058 | 3,370 | 187 | 11 | 6,240 | 15,865 |
| 2061 | 6,044 | 3,369 | 186 | 11 | 6,223 | 15,833 |
| 2062 | 5,035 | 341 | 186 | 11 | 6,223 | 11,795 |
| 2063 | 8,063 | 9,426 | 186 | 11 | 6,223 | 23,908 |

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TABLE 3.16 (continued)
SCENARIO 8: SAFSTOR WITH 200 YEAR DFS, UNIT 2
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|------|--------|--------------------------|--------|--------|--------|---------|
| 2064 | 7,012 | 6,234 | 187 | 11 | 6,240 | 19,684 |
| 2065 | 6,044 | 3,369 | 186 | 11 | 6,223 | 15,833 |
| 2066 | 5,035 | 341 | 186 | 11 | 6,223 | 11,795 |
| 2067 | 5,035 | 341 | 186 | 11 | 6,223 | 11,795 |
| 2068 | 7,067 | 6,398 | 187 | 11 | 6,240 | 19,903 |
| 2069 | 6,549 | 4,883 | 186 | 11 | 6,223 | 17,852 |
| 2070 | 5,035 | 341 | 186 | 11 | 6,223 | 11,795 |
| 2071 | 5,035 | 341 | 186 | 11 | 6,223 | 11,795 |
| 2072 | 7,517 | 7,748 | 187 | 11 | 6,240 | 21,703 |
| 2073 | 5,035 | 341 | 186 | 11 | 6,223 | 11,795 |
| 2074 | 5,035 | 341 | 186 | 11 | 6,223 | 11,795 |
| 2075 | 7,918 | 8,991 | 186 | 11 | 6,223 | 23,329 |
| 2076 | 5,048 | 342 | 187 | 11 | 6,240 | 11,828 |
| 2077 | 5,035 | 341 | 186 | 11 | 6,223 | 11,795 |
| 2078 | 7,558 | 7,911 | 186 | 11 | 6,223 | 21,890 |
| 2079 | 5,035 | 341 | 186 | 11 | 6,223 | 11,795 |
| 2080 | 5,048 | 342 | 187 | 11 | 6,240 | 11,828 |
| 2081 | 5,035 | 341 | 186 | 11 | 6,223 | 11,795 |
| 2082 | 7,449 | 7,583 | 186 | 11 | 6,223 | 21,451 |
| 2083 | 5,035 | 341 | 186 | 11 | 6,223 | 11,795 |
| 2084 | 5,048 | 342 | 187 | 11 | 6,240 | 11,828 |
| 2085 | 5,035 | 341 | 186 | 11 | 6,223 | 11,795 |
| 2086 | 5,035 | 341 | 186 | 11 | 6,223 | 11,795 |
| 2087 | 5,035 | 341 | 186 | 11 | 6,223 | 11,795 |
| 2088 | 38,955 | 48,954 | 1,447 | 4,466 | 6,983 | 100,805 |
| 2089 | 37,814 | 12,311 | 1,841 | 7,041 | 7,394 | 66,402 |
| 2090 | 57,989 | 30,995 | 1,771 | 25,884 | 10,995 | 127,634 |
| 2091 | 59,766 | 13,027 | 1,427 | 24,007 | 9,736 | 107,963 |
| 2092 | 55,869 | 10,125 | 1,253 | 20,460 | 9,106 | 96,813 |
| 2093 | 26,036 | 6,851 | 299 | 28 | 5,933 | 39,148 |

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TABLE 3.16 (continued)
SCENARIO 8: SAFSTOR WITH 200 YEAR DFS, UNIT 2
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|------|--------|--------------------------|--------|--------|-------|--------|
| 2094 | 18,616 | 14,797 | 186 | 0 | 6,093 | 39,692 |
| 2095 | 15,999 | 15,258 | 135 | 0 | 5,343 | 36,736 |
| 2096 | 4,694 | 3,037 | 0 | 0 | 3,392 | 11,123 |
| 2097 | 4,684 | 3,037 | 0 | 0 | 3,383 | 11,104 |
| 2098 | 3,671 | 0 | 0 | 0 | 3,383 | 7,054 |
| 2099 | 4,684 | 3,037 | 0 | 0 | 3,383 | 11,104 |
| 2100 | 5,190 | 4,556 | 0 | 0 | 3,383 | 13,129 |
| 2101 | 5,190 | 4,556 | 0 | 0 | 3,383 | 13,129 |
| 2102 | 5,190 | 4,556 | 0 | 0 | 3,383 | 13,129 |
| 2103 | 3,671 | 0 | 0 | 0 | 3,383 | 7,054 |
| 2104 | 3,681 | 0 | 0 | 0 | 3,392 | 7,073 |
| 2105 | 5,190 | 4,556 | 0 | 0 | 3,383 | 13,129 |
| 2106 | 4,684 | 3,037 | 0 | 0 | 3,383 | 11,104 |
| 2107 | 4,684 | 3,037 | 0 | 0 | 3,383 | 11,104 |
| 2108 | 3,681 | 0 | 0 | 0 | 3,392 | 7,073 |
| 2109 | 4,684 | 3,037 | 0 | 0 | 3,383 | 11,104 |
| 2110 | 4,684 | 3,037 | 0 | 0 | 3,383 | 11,104 |
| 2111 | 4,684 | 3,037 | 0 | 0 | 3,383 | 11,104 |
| 2112 | 3,681 | 0 | 0 | 0 | 3,392 | 7,073 |
| 2113 | 6,709 | 9,112 | 0 | 0 | 3,383 | 19,204 |
| 2114 | 5,696 | 6,075 | 0 | 0 | 3,383 | 15,154 |
| 2115 | 5,043 | 4,117 | 0 | 0 | 3,383 | 12,543 |
| 2116 | 3,681 | 0 | 0 | 0 | 3,392 | 7,073 |
| 2117 | 3,671 | 0 | 0 | 0 | 3,383 | 7,054 |
| 2118 | 5,696 | 6,075 | 0 | 0 | 3,383 | 15,154 |
| 2119 | 5,190 | 4,556 | 0 | 0 | 3,383 | 13,129 |
| 2120 | 3,681 | 0 | 0 | 0 | 3,392 | 7,073 |
| 2121 | 3,671 | 0 | 0 | 0 | 3,383 | 7,054 |
| 2122 | 6,202 | 7,594 | 0 | 0 | 3,383 | 17,179 |
| 2123 | 3,671 | 0 | 0 | 0 | 3,383 | 7,054 |

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TABLE 3.16 (continued)
SCENARIO 8: SAFSTOR WITH 200 YEAR DFS, UNIT 2
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|------|--------|--------------------------|--------|--------|-------|--------|
| 2124 | 3,681 | 0 | 0 | 0 | 3,392 | 7,073 |
| 2125 | 6,202 | 7,594 | 0 | 0 | 3,383 | 17,179 |
| 2126 | 3,671 | 0 | 0 | 0 | 3,383 | 7,054 |
| 2127 | 3,671 | 0 | 0 | 0 | 3,383 | 7,054 |
| 2128 | 6,212 | 7,594 | 0 | 0 | 3,392 | 17,198 |
| 2129 | 3,671 | 0 | 0 | 0 | 3,383 | 7,054 |
| 2130 | 3,671 | 0 | 0 | 0 | 3,383 | 7,054 |
| 2131 | 3,671 | 0 | 0 | 0 | 3,383 | 7,054 |
| 2132 | 6,212 | 7,594 | 0 | 0 | 3,392 | 17,198 |
| 2133 | 3,671 | 0 | 0 | 0 | 3,383 | 7,054 |
| 2134 | 3,671 | 0 | 0 | 0 | 3,383 | 7,054 |
| 2135 | 3,671 | 0 | 0 | 0 | 3,383 | 7,054 |
| 2136 | 3,681 | 0 | 0 | 0 | 3,392 | 7,073 |
| 2137 | 3,671 | 0 | 0 | 0 | 3,383 | 7,054 |
| 2138 | 18,858 | 45,562 | 0 | 0 | 3,383 | 67,803 |
| 2139 | 3,671 | 0 | 0 | 0 | 3,383 | 7,054 |
| 2140 | 3,681 | 0 | 0 | 0 | 3,392 | 7,073 |
| 2141 | 3,671 | 0 | 0 | 0 | 3,383 | 7,054 |
| 2142 | 3,671 | 0 | 0 | 0 | 3,383 | 7,054 |
| 2143 | 3,671 | 0 | 0 | 0 | 3,383 | 7,054 |
| 2144 | 3,681 | 0 | 0 | 0 | 3,392 | 7,073 |
| 2145 | 5,190 | 4,556 | 0 | 0 | 3,383 | 13,129 |
| 2146 | 4,684 | 3,037 | 0 | 0 | 3,383 | 11,104 |
| 2147 | 4,684 | 3,037 | 0 | 0 | 3,383 | 11,104 |
| 2148 | 3,681 | 0 | 0 | 0 | 3,392 | 7,073 |
| 2149 | 4,684 | 3,037 | 0 | 0 | 3,383 | 11,104 |
| 2150 | 5,190 | 4,556 | 0 | 0 | 3,383 | 13,129 |
| 2151 | 5,190 | 4,556 | 0 | 0 | 3,383 | 13,129 |
| 2152 | 5,200 | 4,556 | 0 | 0 | 3,392 | 13,148 |
| 2153 | 3,671 | 0 | 0 | 0 | 3,383 | 7,054 |

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TABLE 3.16 (continued)
SCENARIO 8: SAFSTOR WITH 200 YEAR DFS, UNIT 2
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|------|-------|--------------------------|--------|--------|-------|--------|
| 2154 | 3,671 | 0 | 0 | 0 | 3,383 | 7,054 |
| 2155 | 5,550 | 5,635 | 0 | 0 | 3,383 | 14,568 |
| 2156 | 4,694 | 3,037 | 0 | 0 | 3,392 | 11,123 |
| 2157 | 4,684 | 3,037 | 0 | 0 | 3,383 | 11,104 |
| 2158 | 3,671 | 0 | 0 | 0 | 3,383 | 7,054 |
| 2159 | 4,684 | 3,037 | 0 | 0 | 3,383 | 11,104 |
| 2160 | 4,694 | 3,037 | 0 | 0 | 3,392 | 11,123 |
| 2161 | 4,684 | 3,037 | 0 | 0 | 3,383 | 11,104 |
| 2162 | 3,671 | 0 | 0 | 0 | 3,383 | 7,054 |
| 2163 | 6,709 | 9,112 | 0 | 0 | 3,383 | 19,204 |
| 2164 | 5,706 | 6,075 | 0 | 0 | 3,392 | 15,173 |
| 2165 | 4,684 | 3,037 | 0 | 0 | 3,383 | 11,104 |
| 2166 | 3,671 | 0 | 0 | 0 | 3,383 | 7,054 |
| 2167 | 3,671 | 0 | 0 | 0 | 3,383 | 7,054 |
| 2168 | 5,706 | 6,075 | 0 | 0 | 3,392 | 15,173 |
| 2169 | 5,190 | 4,556 | 0 | 0 | 3,383 | 13,129 |
| 2170 | 3,671 | 0 | 0 | 0 | 3,383 | 7,054 |
| 2171 | 3,671 | 0 | 0 | 0 | 3,383 | 7,054 |
| 2172 | 6,212 | 7,594 | 0 | 0 | 3,392 | 17,198 |
| 2173 | 3,671 | 0 | 0 | 0 | 3,383 | 7,054 |
| 2174 | 3,671 | 0 | 0 | 0 | 3,383 | 7,054 |
| 2175 | 6,202 | 7,594 | 0 | 0 | 3,383 | 17,179 |
| 2176 | 3,681 | 0 | 0 | 0 | 3,392 | 7,073 |
| 2177 | 3,671 | 0 | 0 | 0 | 3,383 | 7,054 |
| 2178 | 6,202 | 7,594 | 0 | 0 | 3,383 | 17,179 |
| 2179 | 3,671 | 0 | 0 | 0 | 3,383 | 7,054 |
| 2180 | 3,681 | 0 | 0 | 0 | 3,392 | 7,073 |
| 2181 | 3,671 | 0 | 0 | 0 | 3,383 | 7,054 |
| 2182 | 6,202 | 7,594 | 0 | 0 | 3,383 | 17,179 |
| 2183 | 3,671 | 0 | 0 | 0 | 3,383 | 7,054 |

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TABLE 3.16 (continued)
SCENARIO 8: SAFSTOR WITH 200 YEAR DFS, UNIT 2
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|------|--------|--------------------------|--------|--------|-------|--------|
| 2184 | 3,681 | 0 | 0 | 0 | 3,392 | 7,073 |
| 2185 | 3,671 | 0 | 0 | 0 | 3,383 | 7,054 |
| 2186 | 3,671 | 0 | 0 | 0 | 3,383 | 7,054 |
| 2187 | 3,671 | 0 | 0 | 0 | 3,383 | 7,054 |
| 2188 | 18,868 | 45,562 | 0 | 0 | 3,392 | 67,822 |
| 2189 | 3,671 | 0 | 0 | 0 | 3,383 | 7,054 |
| 2190 | 3,671 | 0 | 0 | 0 | 3,383 | 7,054 |
| 2191 | 3,671 | 0 | 0 | 0 | 3,383 | 7,054 |
| 2192 | 3,681 | 0 | 0 | 0 | 3,392 | 7,073 |
| 2193 | 3,775 | 311 | 0 | 0 | 3,383 | 7,469 |
| 2194 | 3,931 | 778 | 0 | 0 | 3,383 | 8,092 |
| 2195 | 5,809 | 6,414 | 0 | 0 | 3,383 | 15,606 |
| 2196 | 5,005 | 3,972 | 0 | 0 | 3,392 | 12,369 |
| 2197 | 4,839 | 3,504 | 0 | 0 | 3,383 | 11,727 |
| 2198 | 4,034 | 1,090 | 0 | 0 | 3,383 | 8,507 |
| 2199 | 4,839 | 3,504 | 0 | 0 | 3,383 | 11,727 |
| 2200 | 5,294 | 4,868 | 0 | 0 | 3,383 | 13,544 |
| 2201 | 5,449 | 5,335 | 0 | 0 | 3,383 | 14,167 |
| 2202 | 5,449 | 5,335 | 0 | 0 | 3,383 | 14,167 |
| 2203 | 3,827 | 467 | 0 | 0 | 3,383 | 7,677 |
| 2204 | 3,889 | 623 | 0 | 0 | 3,392 | 7,904 |
| 2205 | 5,397 | 5,179 | 0 | 0 | 3,383 | 13,959 |
| 2206 | 4,839 | 3,504 | 0 | 0 | 3,383 | 11,727 |
| 2207 | 4,891 | 3,660 | 0 | 0 | 3,383 | 11,934 |
| 2208 | 3,889 | 623 | 0 | 0 | 3,392 | 7,904 |
| 2209 | 4,839 | 3,504 | 0 | 0 | 3,383 | 11,727 |
| 2210 | 4,891 | 3,660 | 0 | 0 | 3,383 | 11,934 |
| 2211 | 4,891 | 3,660 | 0 | 0 | 3,383 | 11,934 |
| 2212 | 3,889 | 623 | 0 | 0 | 3,392 | 7,904 |
| 2213 | 6,916 | 9,735 | 0 | 0 | 3,383 | 20,034 |

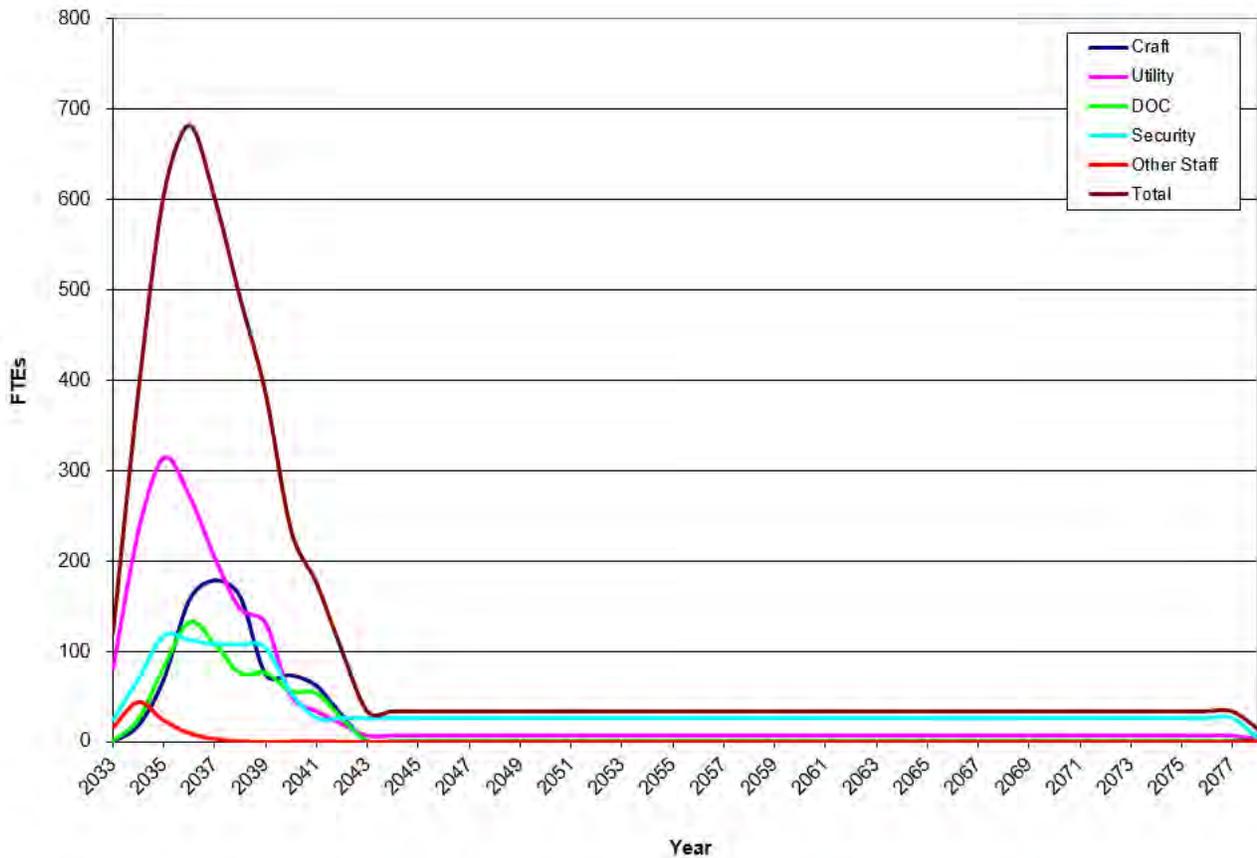
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TABLE 3.16 (continued)
SCENARIO 8: SAFSTOR WITH 200 YEAR DFS, UNIT 2
TOTAL ANNUAL EXPENDITURES
(thousands, 2020 dollars)

| Year | Labor | Equipment & Materials | Energy | Burial | Other | Total |
|--------------|------------------|--------------------------|---------------|---------------|----------------|------------------|
| 2214 | 5,904 | 6,698 | 0 | 0 | 3,383 | 15,984 |
| 2215 | 4,891 | 3,660 | 0 | 0 | 3,383 | 11,934 |
| 2216 | 3,889 | 623 | 0 | 0 | 3,392 | 7,904 |
| 2217 | 3,853 | 2,428 | 0 | 0 | 13,362 | 19,642 |
| 2218 | 1,124 | 887 | 20 | 177 | 1,957 | 4,164 |
| | | | | | | |
| Total | 1,302,354 | 726,832 | 21,282 | 83,454 | 872,596 | 3,006,518 |

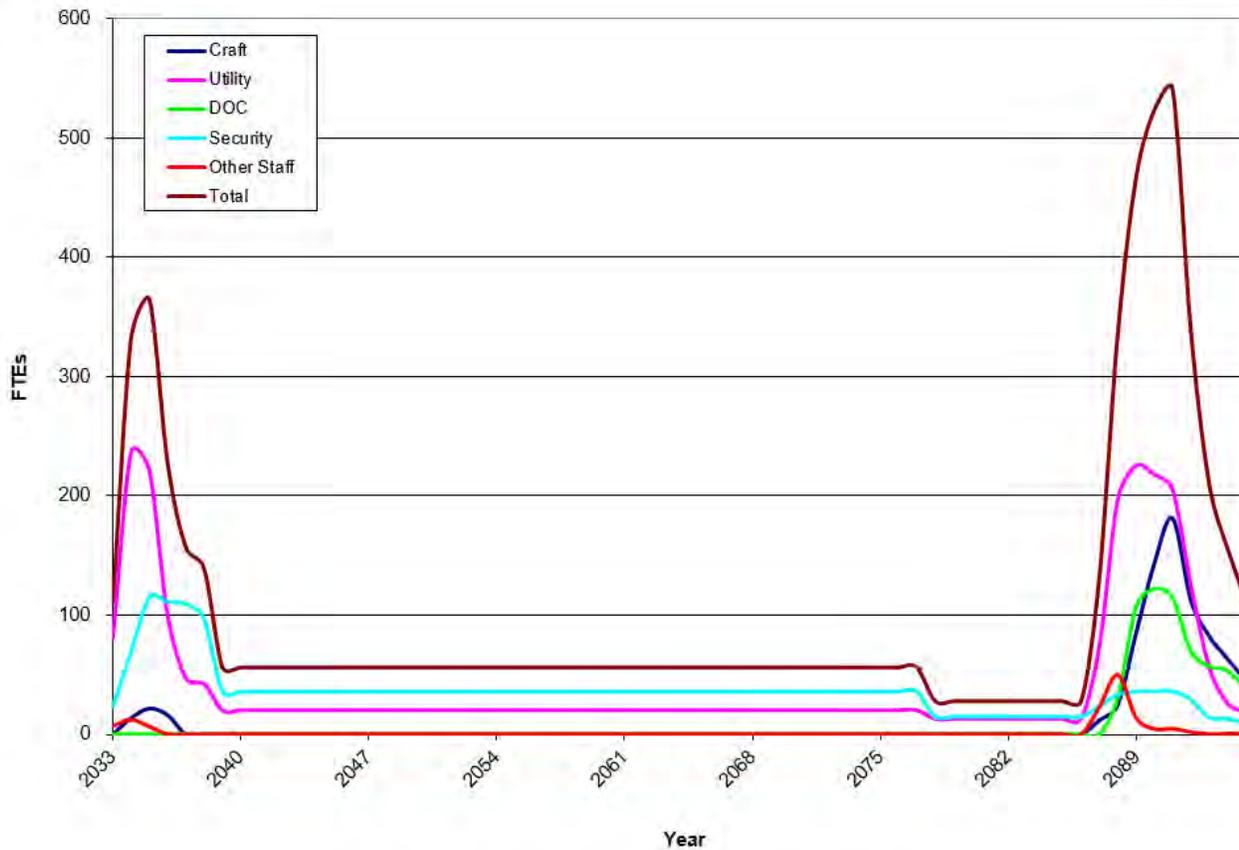
Note: Columns may not add due to rounding

**FIGURE 3.1
 SCENARIO 2: DECON WITH 60 YEAR DFS
 PRAIRIE ISLAND NUCLEAR GENERATING PLANT
 MANPOWER LEVELS**



Note that the labor hour basis of this chart was taken from Appendix D; however not all line items in Appendix D have labor hour values available (e.g. spent fuel canister loading estimates from Xcel Energy)

**FIGURE 3.2
 SCENARIO 6: SAFSTOR WITH 60 YEAR DFS
 PRAIRIE ISLAND NUCLEAR GENERATING PLANT
 MANPOWER LEVELS**



Note that the labor hour basis of this chart was taken from Appendix H; however not all line items in Appendix I have labor hour values available (e.g. spent fuel canister loading estimates from Xcel Energy)

4. SCHEDULE ESTIMATE

The schedules for the decommissioning scenarios considered in this study follow the sequence presented in the AIF/NESP-036 study, with minor changes to reflect recent experience and site-specific constraints. In addition, the scheduling has been revised to reflect the spent fuel management plans described in Section 3.4.1.

A schedule or sequence of activities for the DECON alternative is presented in Figure 4.1. The schedule is also representative of the work activities identified in the delayed dismantling scenarios, absent any spent fuel constraints. The scheduling sequence is based on the fuel being removed from the spent fuel pool within the first four years after operations cease. The key activities listed in the schedule do not reflect a one-to-one correspondence with those activities in the cost tables, but reflect dividing some activities for clarity and combining others for convenience. The schedule was prepared using the "Microsoft Project Professional" computer software. ^[44]

4.1 SCHEDULE ESTIMATE ASSUMPTIONS

The schedule reflects the results of a precedence network developed for the site decommissioning activities, i.e., a PERT (Program Evaluation and Review Technique) Software Package. The work activity durations used in the precedence network reflect the actual man-hour estimates from the cost table, adjusted by stretching certain activities over their slack range and shifting the start and end dates of others. The following assumptions were made in the development of the decommissioning schedule:

- The fuel handling area of the auxiliary building is isolated until such time that all spent fuel has been discharged from the storage pool to the ISFSI. Decontamination and dismantling of the spent fuel storage pool is initiated once the transfer of spent fuel is complete (DECON option).
- All work (except vessel and internals removal) is performed during an 8-hour workday, 5 days per week, with no overtime. There are eleven paid holidays per year.
- Reactor and internals removal activities are performed by using separate crews for different activities working on different shifts, with a corresponding backshift charge for the second shift.
- Multiple crews work parallel activities to the maximum extent possible, consistent with optimum efficiency, adequate access for cutting, removal and laydown space, and with the stringent safety measures necessary during demolition of heavy components and structures.

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- For plant systems removal, the systems with the longest removal durations in areas on the critical path are considered to determine the duration of the activity.

4.2 PROJECT SCHEDULE

The period-dependent costs presented in the detailed cost tables are based upon the durations developed in the schedules for decommissioning Prairie Island. Durations are established between several milestones in each project period; these durations are used to establish a critical path for the entire project. In turn, the critical path duration for each period is used as the basis for determining the period-dependent costs. A second parallel path is also shown for the spent fuel cooling period, which determines the release of the auxiliary building for final decontamination.

Project timelines are provided in Figures 4.2 through 4.9 with milestone dates based on a 2033/2034 shutdown dates. The spent fuel pool is emptied approximately four years after shutdown, while ISFSI operations continue until the DOE completes the transfer of assemblies. Deferred decommissioning operations in all scenarios are assumed to commence so that the operating licenses are terminated within a 60-year period from the cessation of operations.

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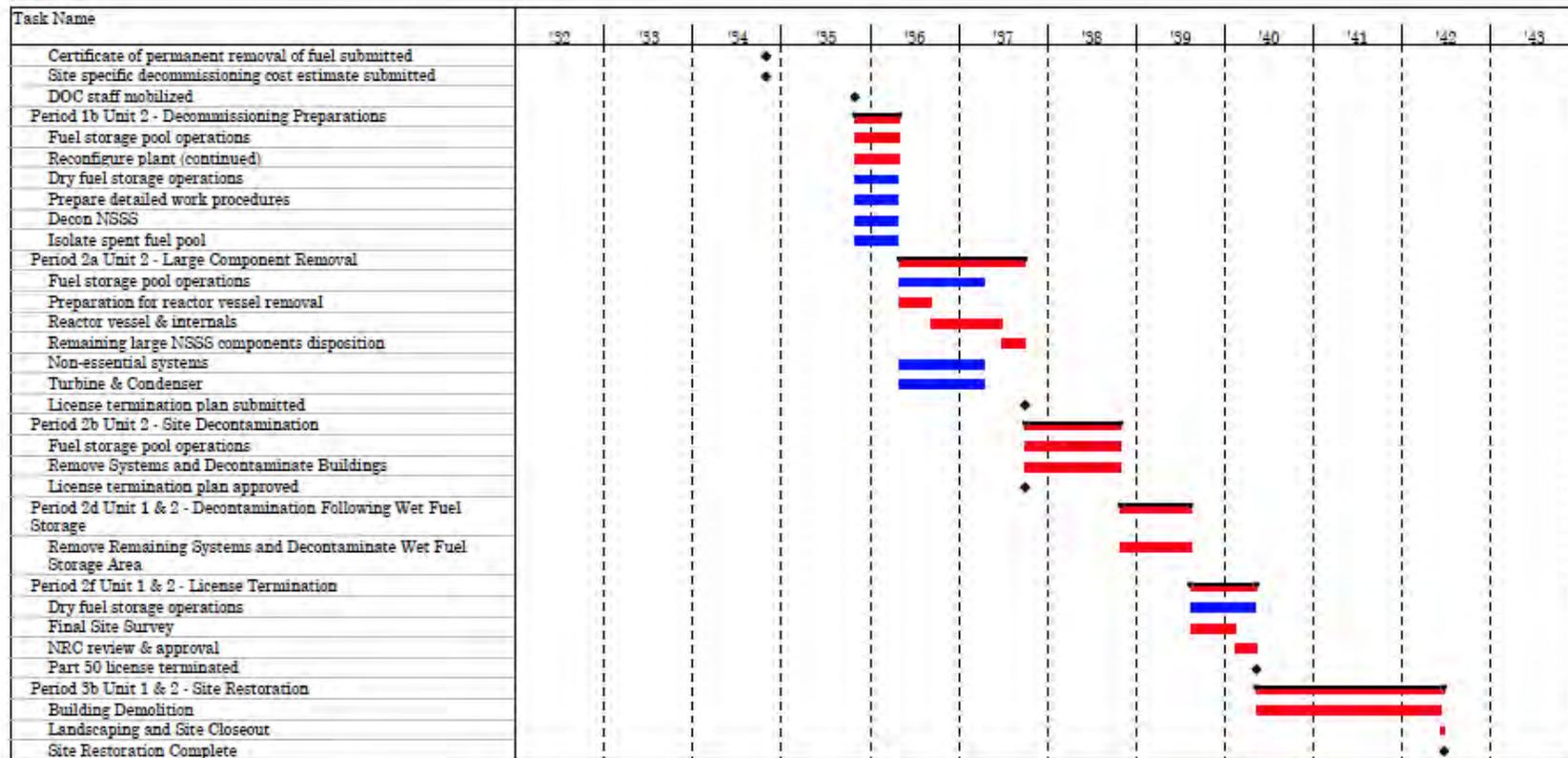
**FIGURE 4.1
 DECON ACTIVITY SCHEDULE**



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**FIGURE 4.1 (continued)
DECON ACTIVITY SCHEDULE**



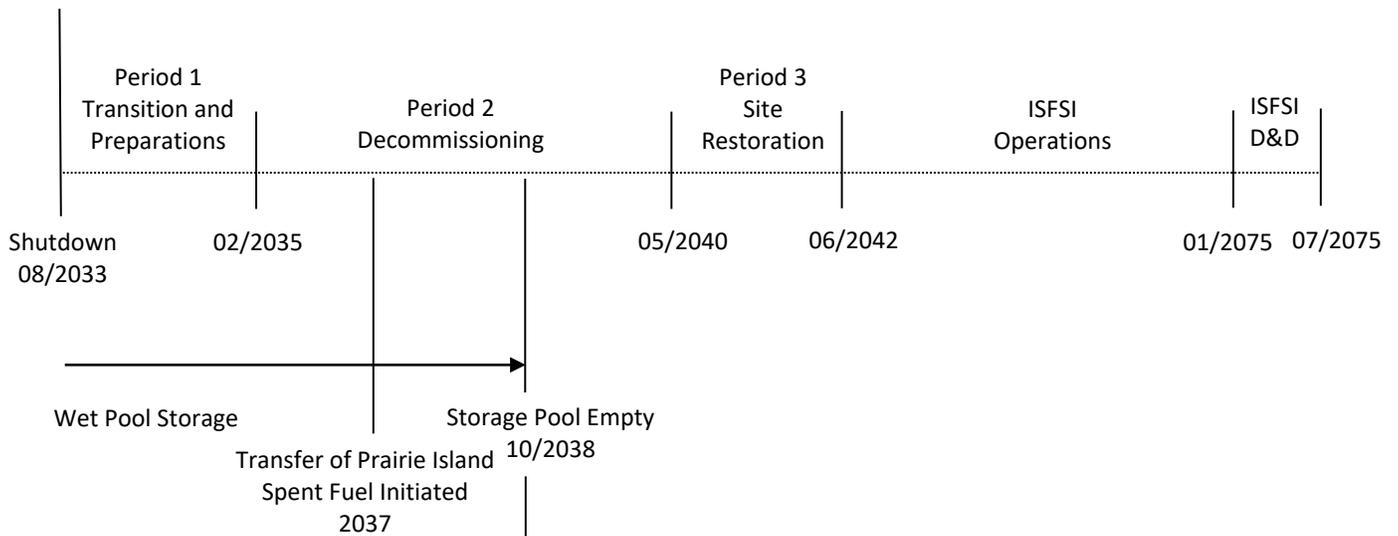
1. Red scheduling bars indicate critical path activities
2. Blue scheduling bars associated with non-critical path activities
3. Diamond symbols indicate major milestones

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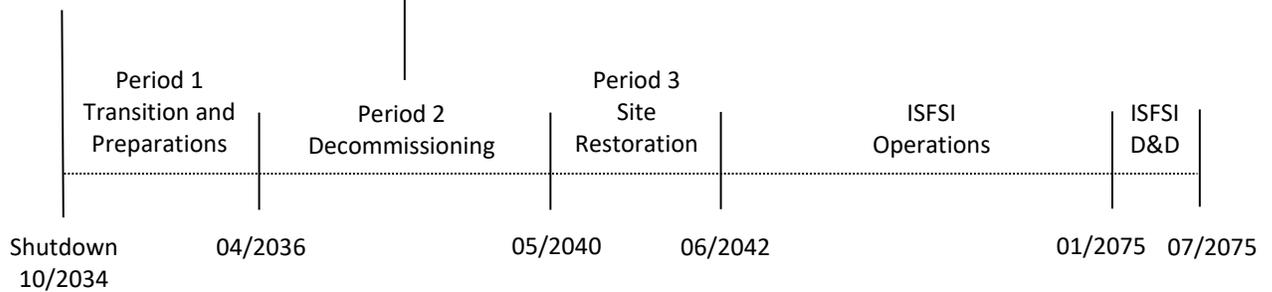
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**FIGURE 4.2
SCENARIO 1: DECON WITH 42 YEAR DFS
DECOMMISSIONING TIMELINE
(not to scale)**

Unit 1

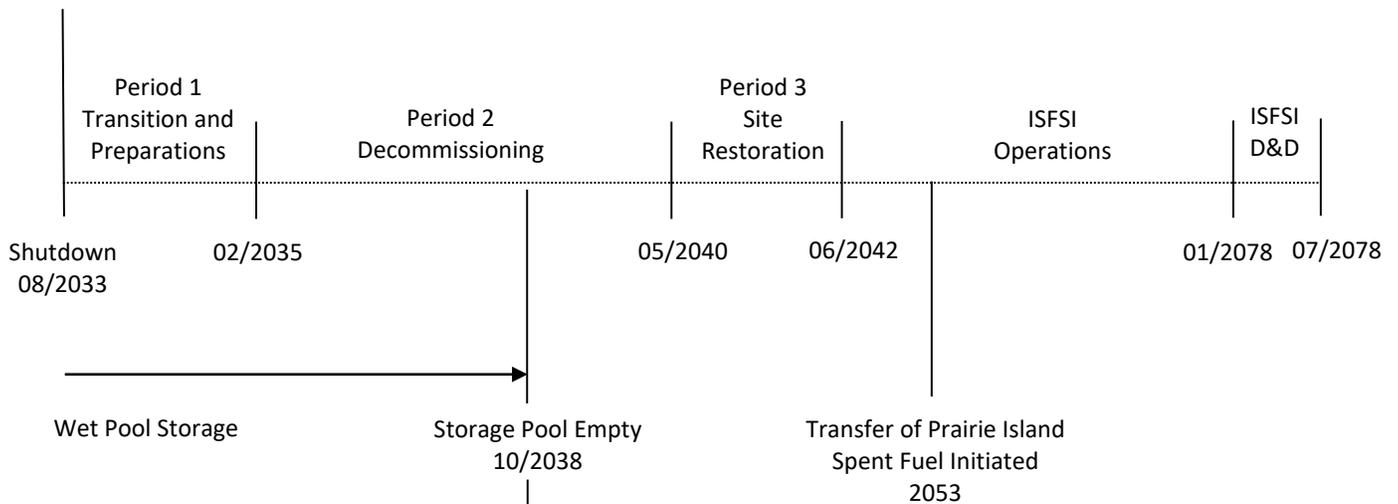


Unit 2

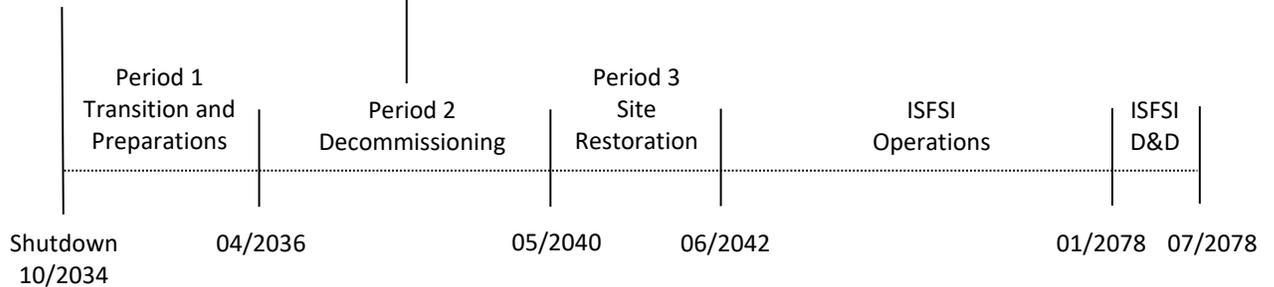


**FIGURE 4.3
 SCENARIO 2: DECON WITH 60 YEAR DFS
 DECOMMISSIONING TIMELINE
 (not to scale)**

Unit 1

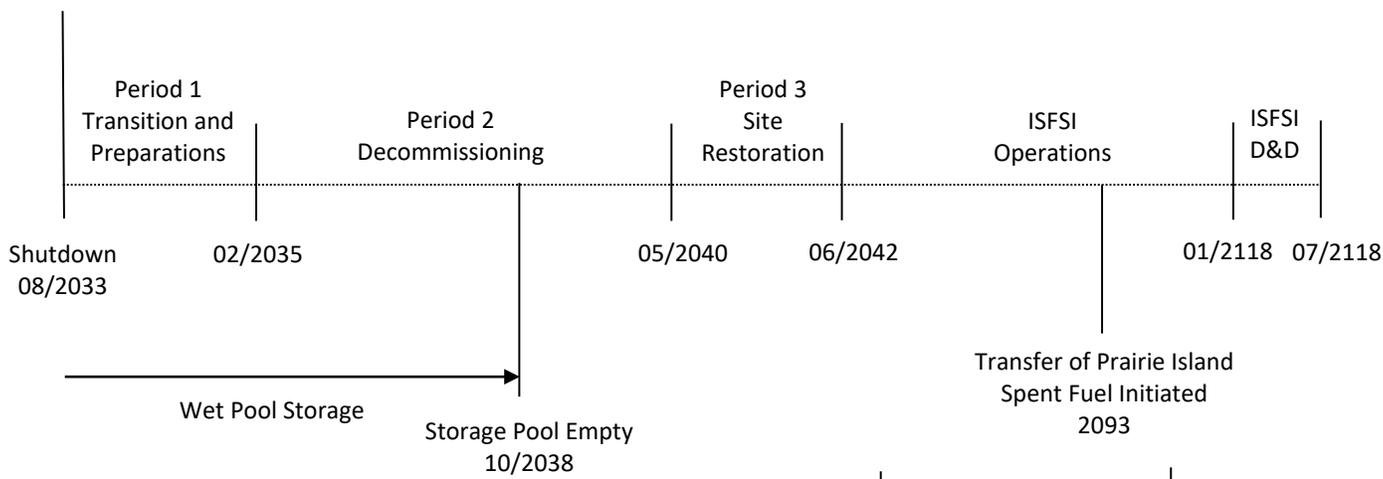


Unit 2

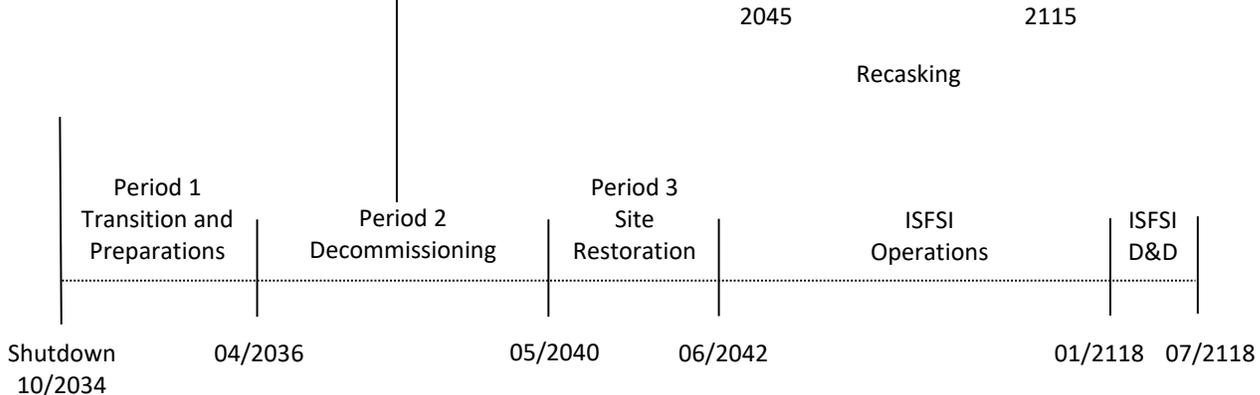


**FIGURE 4.4
 SCENARIO 3: DECON WITH 100 YEAR DFS
 DECOMMISSIONING TIMELINE**
 (not to scale)

Unit 1



Unit 2

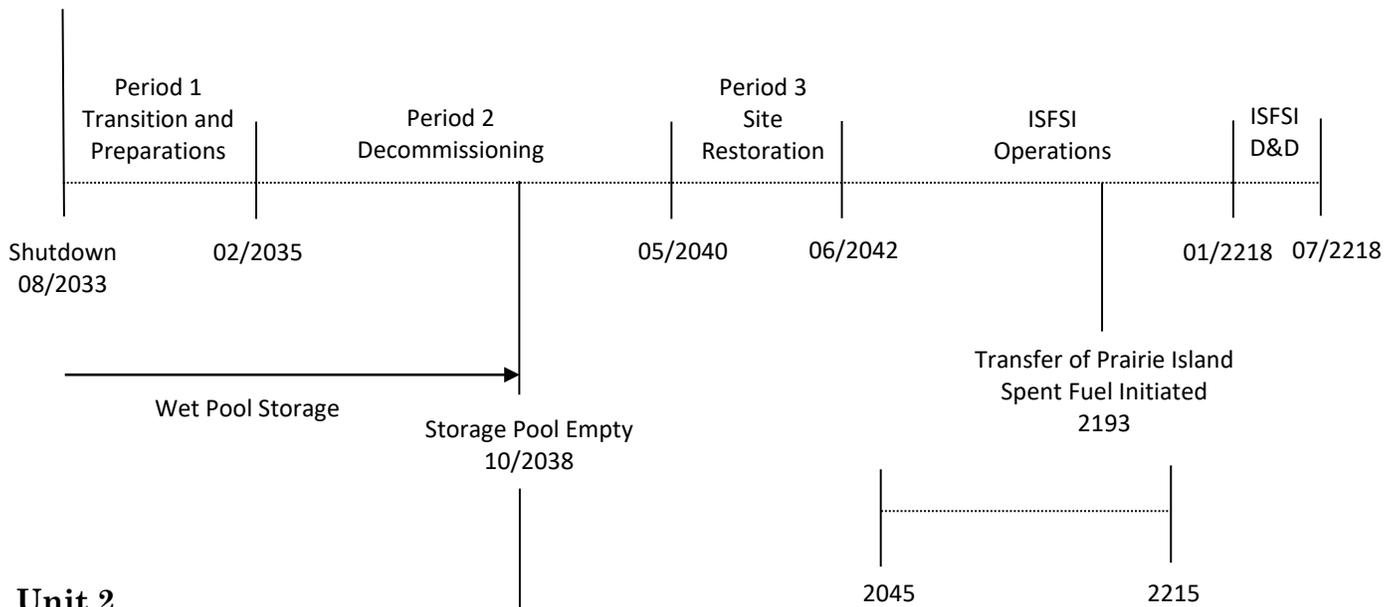


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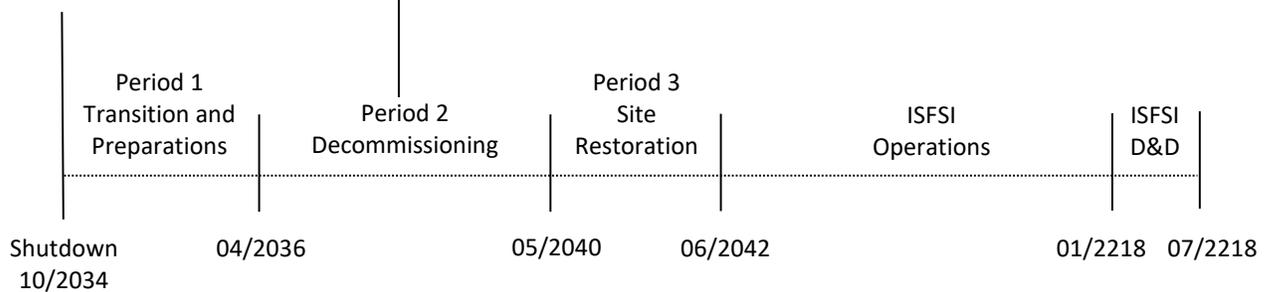
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**FIGURE 4.5
 SCENARIO 4: DECON WITH 200 YEAR DFS
 DECOMMISSIONING TIMELINE
 (not to scale)**

Unit 1



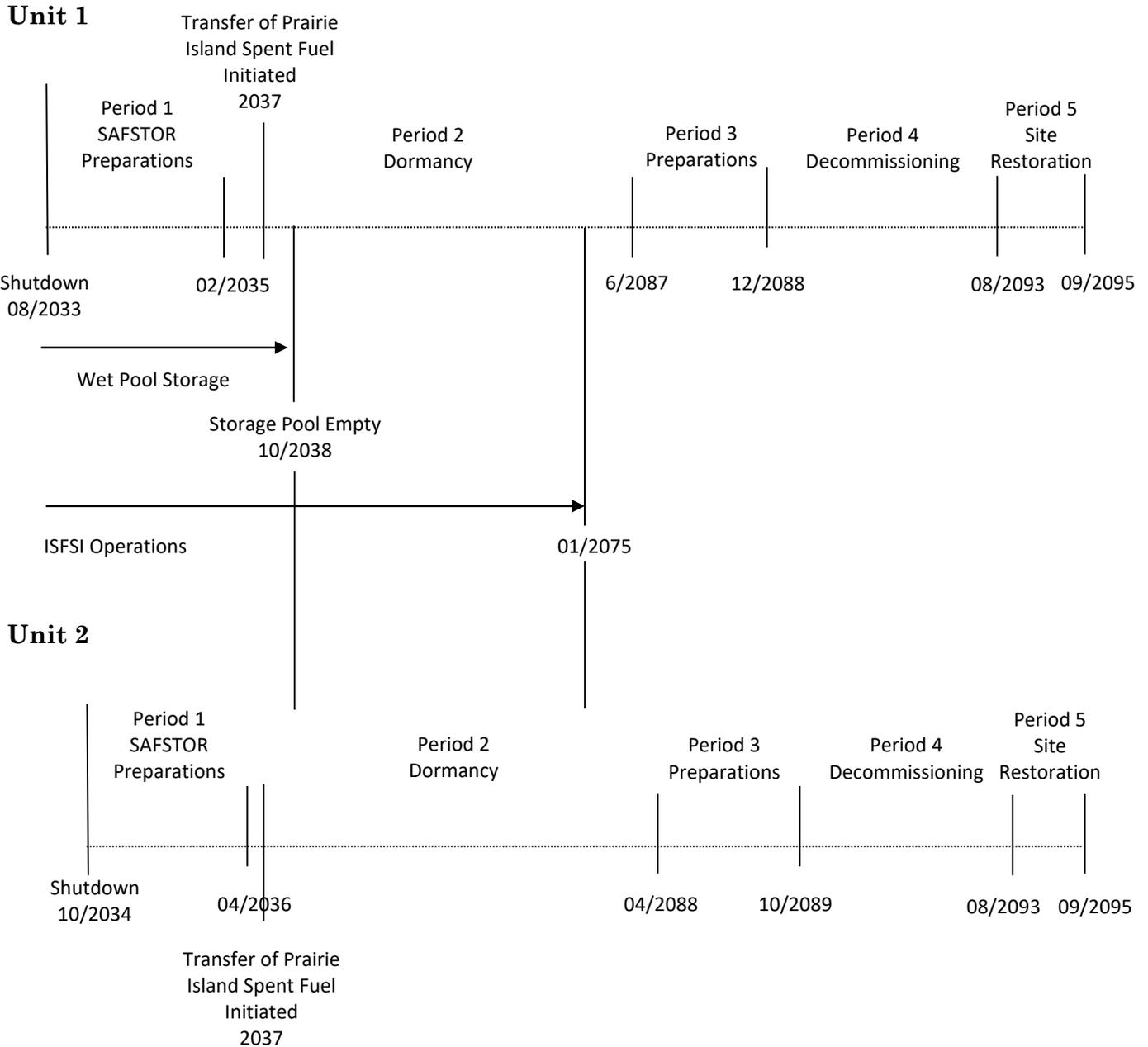
Unit 2



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**FIGURE 4.6
SCENARIO 5: SAFSTOR WITH 42 YEAR DFS
DECOMMISSIONING TIMELINE
(not to scale)**

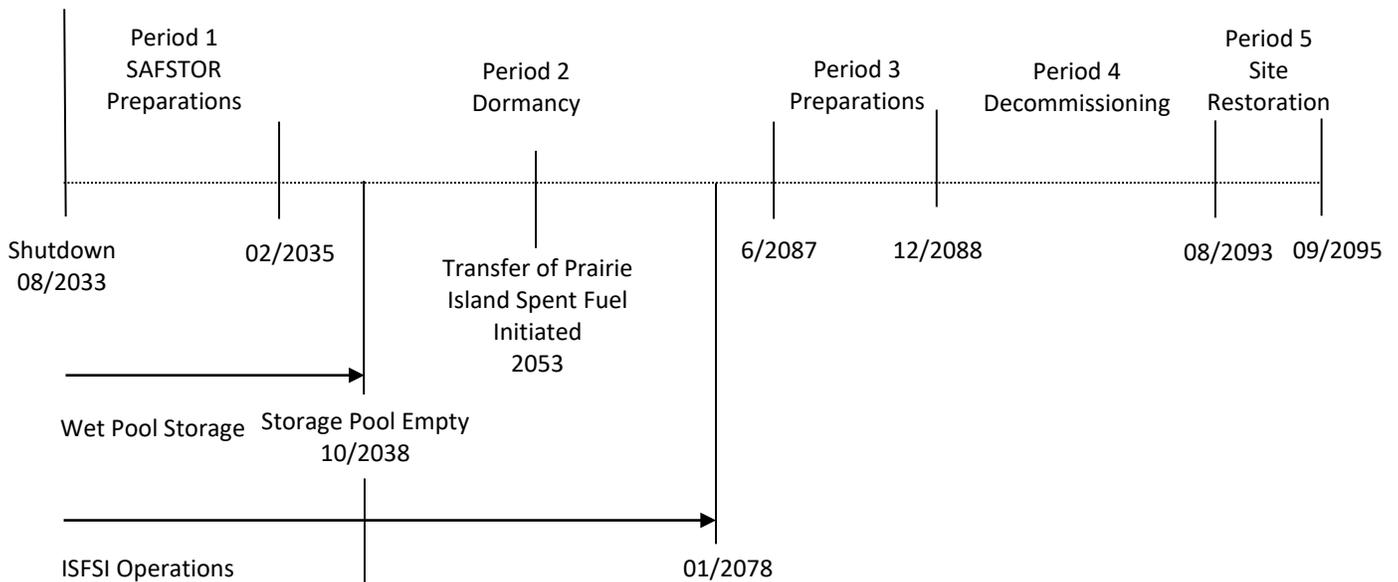


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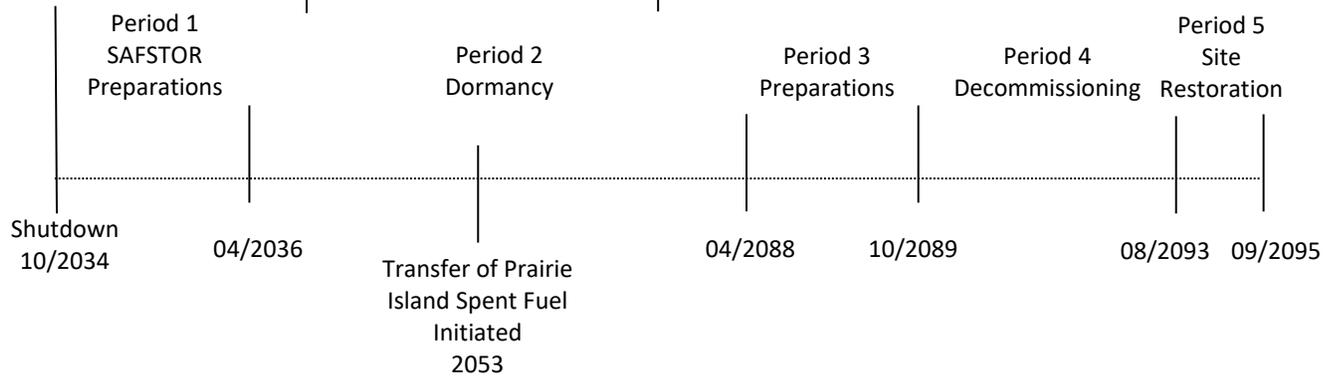
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**FIGURE 4.7
 SCENARIO 6: SAFSTOR WITH 60 YEAR DFS
 DECOMMISSIONING TIMELINE**
 (not to scale)

Unit 1

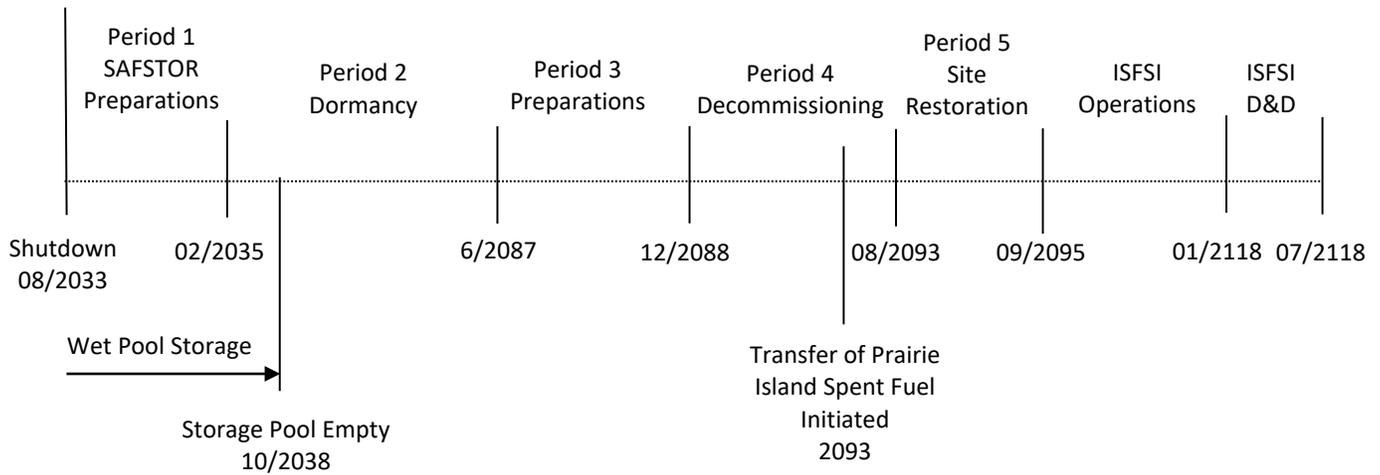


Unit 2

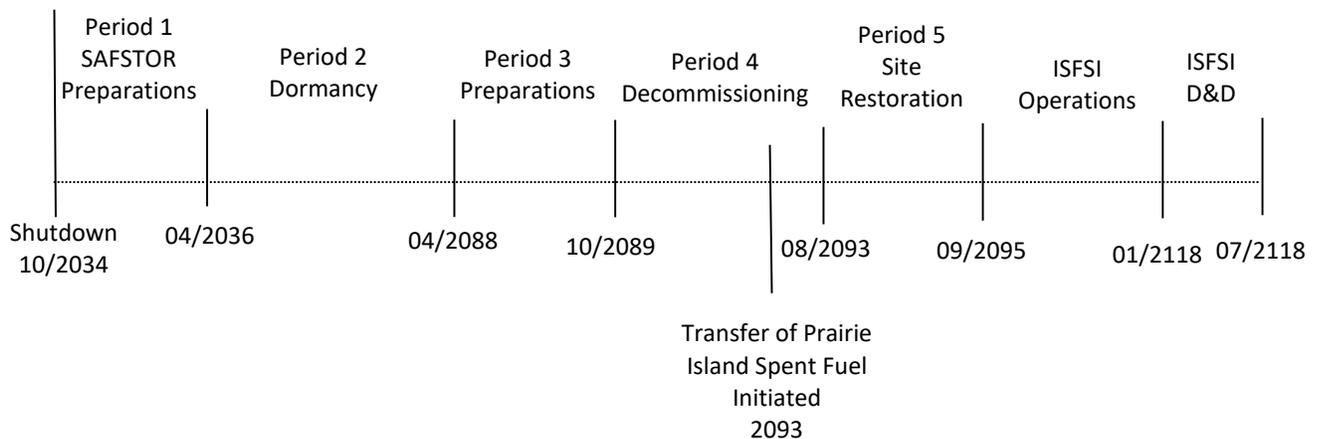


**FIGURE 4.8
 SCENARIO 7: SAFSTOR WITH 100 YEAR DFS
 DECOMMISSIONING TIMELINE
 (not to scale)**

Unit 1



Unit 2



Recasking campaigns occur 2045 through 2088, and 2095 through 2115.

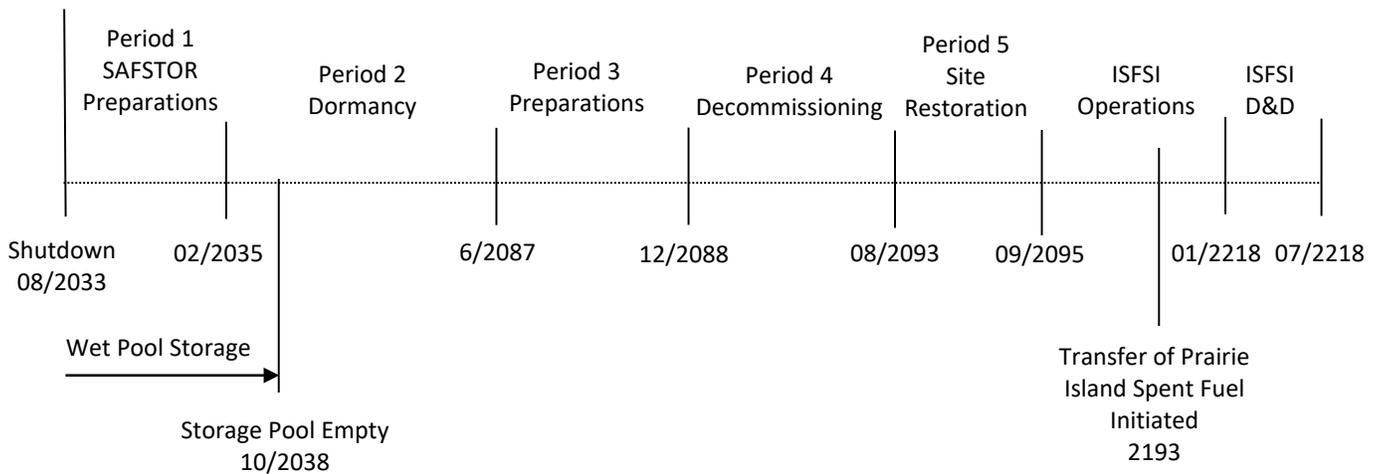
DOE pickup of fuel occurs from 2093 to 2118.

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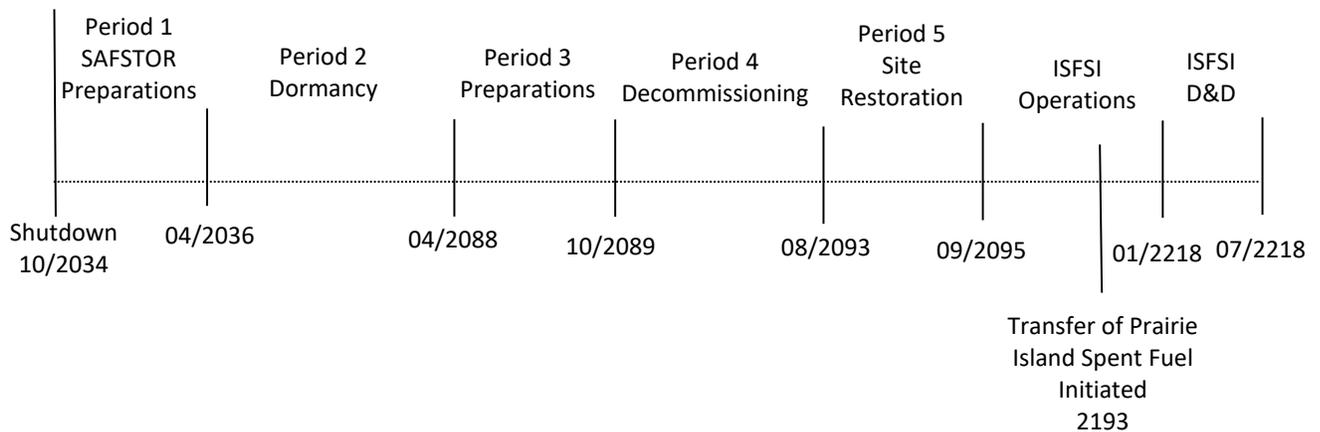
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**FIGURE 4.9
 SCENARIO 8: SAFSTOR WITH 200 YEAR DFS
 DECOMMISSIONING TIMELINE
 (not to scale)**

Unit 1



Unit 2



Recasking campaigns occur 2045 through 2088, 2095 through 2138, 2145 through 2188, and 2195 through 2215.

DOE pickup of fuel occurs from 2193 to 2118.

5. RADIOACTIVE WASTES

The objectives of the decommissioning process are the removal of all radioactive material from the site that would restrict its future use and the termination of the NRC licenses. This currently requires the remediation of all radioactive material at the site in excess of applicable legal limits. Under the Atomic Energy Act, ^[45] the NRC is responsible for protecting the public from sources of ionizing radiation. Title 10 of the Code of Federal Regulations delineates the production, utilization, and disposal of radioactive materials and processes. In particular, Part 71 defines radioactive material as it pertains to transportation and Part 61 specifies its disposition.

Most of the materials being transported for controlled burial are categorized as Low Specific Activity (LSA) or Surface Contaminated Object (SCO) materials containing Type A quantities, as defined in 49 CFR Parts 173-178. Shipping containers are required to be Industrial Packages (IP-1, IP-2 or IP-3, as defined in 10 CFR §173.411). For this study, commercially available steel containers are presumed to be used for the disposal of piping, small components, and concrete. Larger components can serve as their own containers, with proper closure of all openings, access ways, and penetrations.

The destinations for the various waste streams from decommissioning are identified in Figures 5.1 and 5.2. The volumes of radioactive waste generated during the various decommissioning activities at the site are shown on a line-item basis in Appendices C through J and summarized in Tables 5.1 through 5.8. The quantified waste volume summaries shown in these tables are consistent with §61 classifications. The volumes are calculated based on the exterior dimensions for containerized material and on the displaced volume of components serving as their own waste containers.

The reactor vessel and internals are categorized as large quantity shipments and, accordingly, will be shipped in reusable, shielded truck casks with disposable liners. In calculating disposal costs, the burial fees are applied against the liner volume, as well as the special handling requirements of the payload. Packaging efficiencies are lower for the highly activated materials (greater than Type A quantity waste), where high concentrations of gamma-emitting radionuclides limit the capacity of the shipping canisters.

No process system containing/handling radioactive substances at shutdown is presumed to meet material release criteria by decay alone, i.e., systems radioactive at shutdown will still be radioactive over the time period during which the decommissioning is accomplished, due to the presence of long-lived radionuclides.

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While the dose rates decrease with time, radionuclides such as ^{137}Cs will still control the disposition requirements.

The waste material generated in the decontamination and dismantling of Prairie Island is primarily generated during Period 2 of the DECON alternatives and Period 4 of the SAFSTOR alternatives. Material that is considered potentially contaminated when removed from the radiologically controlled area is sent to processing facilities in Tennessee for conditioning and disposal. Heavily contaminated components and activated materials are routed for controlled disposal. The disposal volumes reported in the tables reflect the savings resulting from reprocessing and recycling.

Disposal fees are calculated using representative costs, with surcharges added for the highly activated components, for example, generated in the segmentation of the reactor vessels. The cost to dispose of the majority of the material generated from the decontamination and dismantling activities is based upon representative rates.

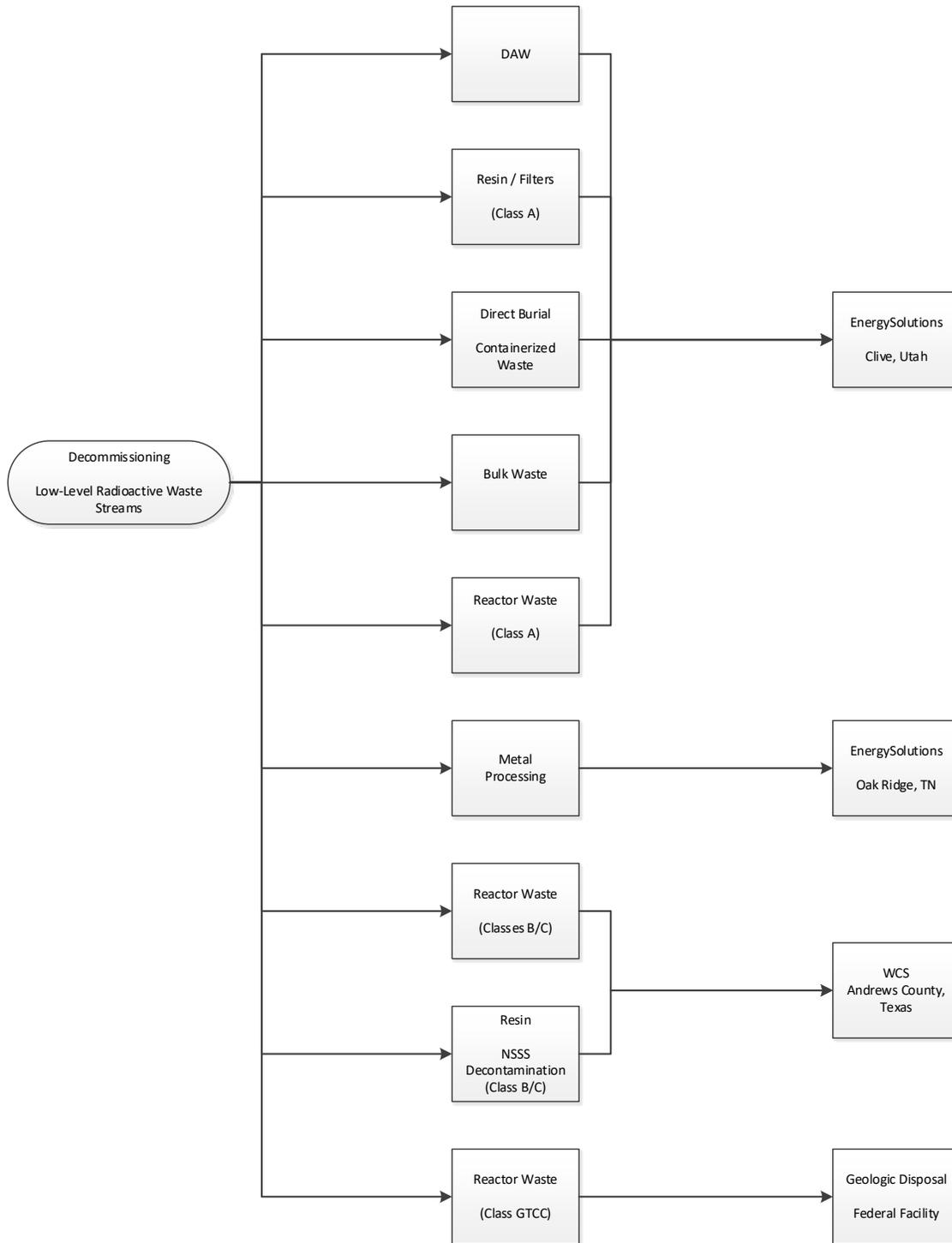
EnergySolutions is not able to accept the higher activity waste (Class B and C) generated in the decontamination of the NSSS and segmentation of the components closest to the core. Waste disposal costs for the higher activity waste (Class B and C) are based upon preliminary and indicative information on the cost for such from WCS.

A small quantity of material generated during the Prairie Island decommissioning will not be considered suitable for near-surface disposal, and is assumed to be disposed of in a geologic repository, in a manner similar to that envisioned for spent fuel disposal. Such material, known as Greater-Than-Class-C or GTCC material, is estimated to require eight spent fuel storage canisters (or the equivalent) to dispose of the most radioactive portions of the reactor vessel internals. The volume and weight reported in Tables 5.1 through 5.8 represent the packaged weight and volume of the spent fuel storage canisters.

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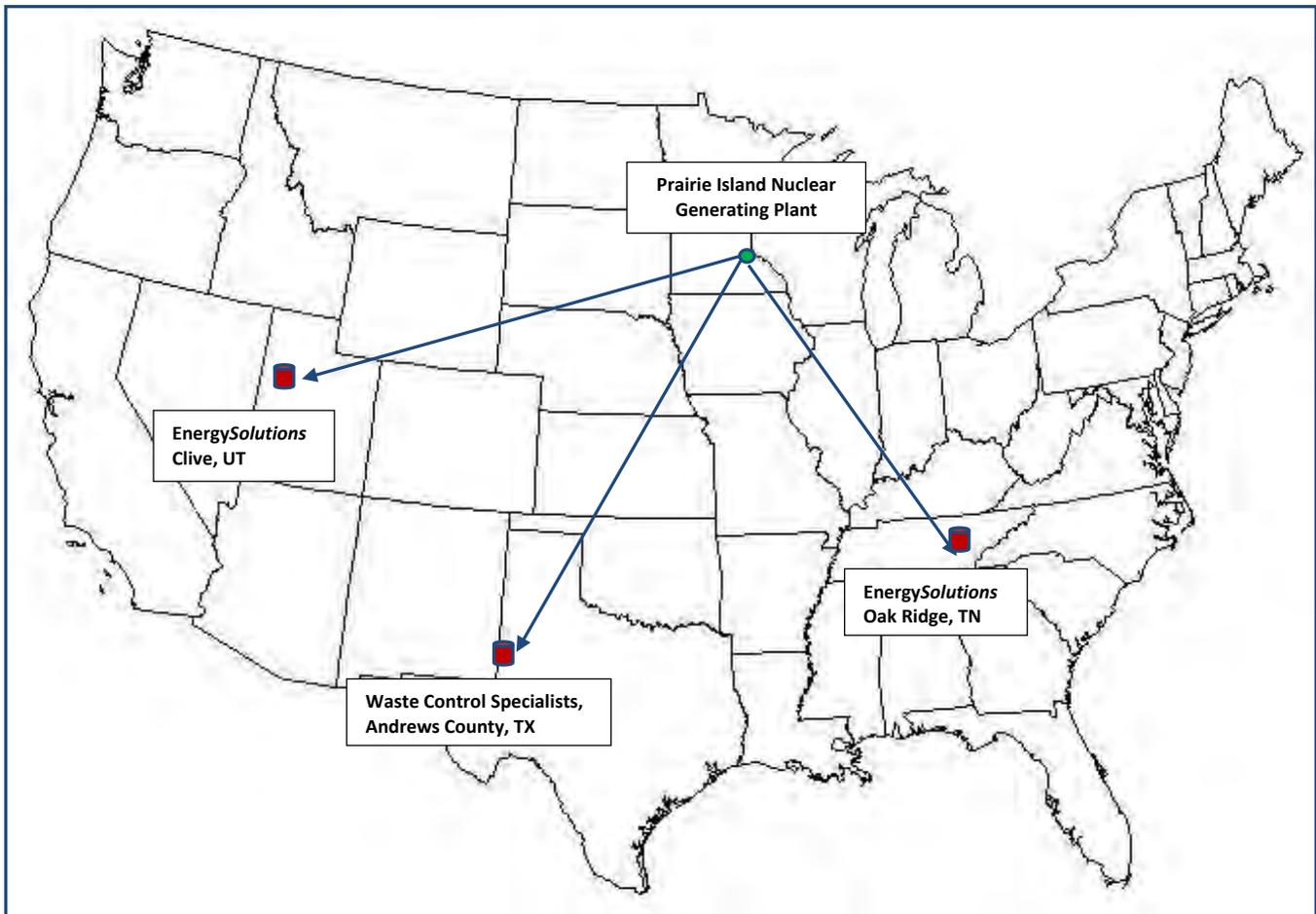
**FIGURE 5.1
RADIOACTIVE WASTE DISPOSITION**



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**FIGURE 5.2
DECOMMISSIONING WASTE DESTINATIONS
RADIOLOGICAL**



The figure indicates the destinations for the low-level radioactive waste designated for direct disposal (Clive, Utah) and processing/recovery (Oak Ridge, Tennessee).

Disposition of the Class B and C low-level radioactive waste will be at the Waste Control Specialists site in Andrews County, Texas.

Disposition options (and destinations) for GTCC are still being evaluated.

**Prairie Island Nuclear Generating Plant
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Section 5, Page 5 of 12****TABLE 5.1
SCENARIO 1: DECON WITH 42 YEAR DFS
DECOMMISSIONING WASTE SUMMARY**

| Waste | Cost Basis | Class ^[1] | Waste Volume (cubic feet) | Mass (pounds) |
|---|---|----------------------|------------------------------|------------------|
| Low-Level Radioactive Waste (near-surface disposal) | EnergySolutions Containerized | A | 205,136 | 11,929,447 |
| | EnergySolutions Bulk | A | 146,529 | 6,720,310 |
| | Future LLRW Disposal Facility (Proxy) | B | 1,651 | 176,286 |
| | Future LLRW Disposal Facility (Proxy) | C | 1,346 | 199,444 |
| Greater than Class C (geologic repository) | Spent Fuel Equivalent | GTCC | 3,547 | 689,647 |
| | | | | |
| Total ^[2] | | | 358,209 | 19,715,134 |
| | | | | |
| Processed/Conditioned (off-site recycling center) | Recycling Vendors | A | 314,250 | 12,618,444 |
| | | | | |
| Scrap Metal | | | | 150,506,000 |

^[1] Waste is classified according to the requirements as delineated in Title 10 CFR, Part 61.55

^[2] Columns may not add due to rounding

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SCENARIO 2: DECON WITH 60 YEAR DFS
DECOMMISSIONING WASTE SUMMARY**

| Waste | Cost Basis | Class ^[1] | Waste Volume (cubic feet) | Mass (pounds) |
|---|---|----------------------|------------------------------|------------------|
| Low-Level Radioactive Waste (near-surface disposal) | EnergySolutions Containerized | A | 205,136 | 11,929,447 |
| | EnergySolutions Bulk | A | 146,529 | 6,720,310 |
| | Future LLRW Disposal Facility (Proxy) | B | 1,651 | 176,286 |
| | Future LLRW Disposal Facility (Proxy) | C | 1,346 | 199,444 |
| Greater than Class C (geologic repository) | Spent Fuel Equivalent | GTCC | 3,547 | 689,647 |
| | | | | |
| Total ^[2] | | | 358,209 | 19,715,134 |
| | | | | |
| Processed/Conditioned (off-site recycling center) | Recycling Vendors | A | 314,250 | 12,618,444 |
| | | | | |
| Scrap Metal | | | | 150,506,000 |

^[1] Waste is classified according to the requirements as delineated in Title 10 CFR, Part 61.55

^[2] Columns may not add due to rounding

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Section 5, Page 8 of 12****TABLE 5.4
SCENARIO 4: DECON WITH 200 YEAR DFS
DECOMMISSIONING WASTE SUMMARY**

| Waste | Cost Basis | Class ^[1] | Waste Volume (cubic feet) | Mass (pounds) |
|---|---|----------------------|------------------------------|------------------|
| Low-Level Radioactive Waste (near-surface disposal) | EnergySolutions Containerized | A | 205,136 | 11,933,347 |
| | EnergySolutions Bulk | A | 146,525 | 6,720,228 |
| | Future LLRW Disposal Facility (Proxy) | B | 1,651 | 176,286 |
| | Future LLRW Disposal Facility (Proxy) | C | 1,346 | 199,444 |
| Greater than Class C (geologic repository) | Spent Fuel Equivalent | GTCC | 3,547 | 689,647 |
| | | | | |
| Total ^[2] | | | 358,205 | 19,718,952 |
| | | | | |
| Processed/Conditioned (off-site recycling center) | Recycling Vendors | A | 314,250 | 12,618,444 |
| | | | | |
| Scrap Metal | | | | 150,506,000 |

^[1] Waste is classified according to the requirements as delineated in Title 10 CFR, Part 61.55

^[2] Columns may not add due to rounding

6. RESULTS

This report presents estimates of the cost to decommission Prairie Island for the selected decommissioning scenarios following the cessation of plant operations. The estimates are based on numerous fundamental assumptions, including regulatory requirements, project contingencies, low-level radioactive waste disposal practices, high-level radioactive waste management options, and site restoration requirements. While not an engineering study, the estimates provide Xcel Energy with sufficient information to assess their financial obligations, as they pertain to the eventual decommissioning of the nuclear station.

The decommissioning scenarios assume continued operation of the station's spent fuel pool for a minimum of four years following the cessation of operations for continued cooling of the assemblies. The existing ISFSI is expanded to accommodate the spent fuel, once sufficiently cooled, until such time that the DOE can complete the transfer of the assemblies to its repository.

Using Scenario 2 as the base case, the cost projected to promptly decommission the station, restore the site, and manage the spent fuel is estimated to be \$2.048 billion (2020 dollars). The majority of this cost (approximately 58.0%) is associated with the physical decontamination and dismantling of the nuclear plant so that the operating licenses can be terminated. Another 36.0% is associated with the management, interim storage, and eventual transfer of the spent fuel. The remaining 6.0% is for the demolition of the designated structures and limited restoration of the site.

The primary cost contributors, identified in Tables 6.1 through 6.8, are either labor-related or associated with the management and disposition of the spent fuel or radioactive waste. Program management (including security) is the largest single contributor to the overall cost. The magnitude of the expense is a function of both the size of the organization required to manage the decommissioning, as well as the duration of the program. It is assumed, for purposes of this analysis, that Xcel Energy will hire a contractor to manage the decommissioning labor force. The size and composition of the management organizations varies with the decommissioning phase and associated site activities. However, once the operating licenses are amended or terminated, the staff is substantially reduced for the conventional demolition and restoration of the site, and the long-term care of the spent fuel (for the DECON alternative).

As described in this report, the spent fuel pool will remain operational for a minimum of four years following the cessation of operations. The pool will be isolated and an independent spent fuel island created. This will allow

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decommissioning operations to proceed in and around the pool areas. Over the four-year period, the spent fuel will be packaged into transportable canisters for future loading into a DOE-provided transport cask or relocation to the ISFSI. The canisters will be stored in horizontal storage casks at the ISFSI until the DOE is able to receive them. Dry storage of the fuel provides additional flexibility in the event the DOE is not able to meet the current timetable for completing the transfer of assemblies to an off-site facility and minimizes the associated caretaking expenses.

The cost for waste disposal includes only those costs associated with the controlled disposition of the low-level radioactive waste generated from decontamination and dismantling activities, including plant equipment and components, structural material, filters, resins and dry-active waste. As described in Section 5, disposition of the majority of the low-level radioactive material requiring controlled disposal is at the EnergySolutions facility, with higher-activity waste sent to the WCS facility. Highly activated components, requiring additional isolation from the environment (GTCC), are packaged for geologic disposal. The cost of geologic disposal is based upon a cost equivalent for spent fuel.

A significant portion of the metallic waste is designated for additional processing and treatment at an off-site facility. Processing reduces the volume of material requiring controlled disposal through such techniques and processes as survey and sorting, decontamination, and volume reduction. The material that cannot be unconditionally released is packaged for controlled disposal at one of the currently operating facilities. The cost identified in the summary tables for processing is all-inclusive, incorporating the ultimate disposition of the material.

Removal costs reflect the labor-intensive nature of the decommissioning process, as well as the management controls required to ensure a safe and successful program. Decontamination and packaging costs also have a large labor component that is based upon prevailing wages. Non-radiological demolition is a natural extension of the decommissioning process. The methods employed in decontamination and dismantling are generally destructive and indiscriminate in inflicting collateral damage. With a work force mobilized to support decommissioning operations, non-radiological demolition can be an integrated activity and a logical expansion of the work being performed in the process of terminating the operating licenses.

The reported cost for transport includes the tariffs and surcharges associated with moving large components and/or overweight shielded casks overland, as well as the general expense, e.g., labor and fuel, of transporting material to the destinations identified in this report. For purposes of this analysis, material is moved overland by truck.

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Decontamination is used to reduce the plant's radiation fields and minimize worker exposure. Slightly contaminated material or material located within a contaminated area is sent to an off-site processing center, i.e., this analysis does not assume that contaminated plant components and equipment can be decontaminated for uncontrolled release in-situ. Centralized processing centers have proven to be a more economical means of handling the large volumes of material produced in the dismantling of a nuclear plant.

License termination survey costs are associated with the labor intensive and complex activity of verifying that contamination has been removed from the site to the levels specified by the regulating agency. This process involves a systematic survey of all remaining plant surface areas and surrounding environs, sampling, isotopic analysis, and documentation of the findings. The status of any plant components and materials not removed in the decommissioning process will also require confirmation and will add to the expense of surveying the facilities alone.

The remaining costs include allocations for heavy equipment and temporary services, as well as for other expenses such as regulatory fees and the premiums for nuclear insurance. While site operating costs are greatly reduced following the final cessation of plant operations, certain administrative functions do need to be maintained either at a basic functional or regulatory level.

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TABLE 6.1
SCENARIO 1: DECON WITH 42 YEAR DFS
DECOMMISSIONING COST ELEMENTS
(thousands of 2020 dollars)

| Cost Element | Unit 1 | Unit 2 | Total | Percentage |
|---|----------------|------------------|------------------|---------------|
| Decontamination | 12,109 | 19,308 | 31,417 | 1.6% |
| Removal | 111,005 | 147,842 | 258,847 | 12.9% |
| Packaging | 27,756 | 28,136 | 55,892 | 2.8% |
| Transportation | 9,509 | 10,116 | 19,625 | 1.0% |
| Waste Disposal | 75,656 | 79,069 | 154,725 | 7.7% |
| Off-site Waste Processing | 26,049 | 30,811 | 56,860 | 2.8% |
| Program Management ^[1] | 239,340 | 227,121 | 466,461 | 23.3% |
| Security | 148,214 | 136,512 | 284,726 | 14.2% |
| Spent Fuel Pool Isolation | 14,576 | 9,718 | 24,294 | 1.2% |
| Spent Fuel Storage (Direct Costs) ^[2] | 114,819 | 111,649 | 226,467 | 11.3% |
| Insurance and Regulatory Fees | 19,822 | 16,763 | 36,586 | 1.8% |
| Energy | 10,742 | 9,033 | 19,775 | 1.0% |
| Characterization and Licensing Surveys | 14,531 | 16,907 | 31,438 | 1.6% |
| Property Taxes | 77,623 | 72,753 | 150,376 | 7.5% |
| Miscellaneous | 7,729 | 7,430 | 15,159 | 0.8% |
| Railroad Track Maintenance | 3,543 | 3,455 | 6,998 | 0.3% |
| Retention and Severance | 26,985 | 26,985 | 53,970 | 2.7% |
| Security Modifications | 5,000 | 5,000 | 10,000 | 0.5% |
| Prairie Island Indian Community Payments | 51,745 | 50,219 | 101,964 | 5.1% |
| Total [2] | 996,753 | 1,008,829 | 2,005,582 | 100.0% |

| Cost Element | Unit 1 | Unit 2 | Total | Percentage |
|-----------------------------|----------------|------------------|------------------|---------------|
| NRC License Termination | 595,962 | 590,962 | 1,186,924 | 59.2% |
| Spent Fuel Management | 349,793 | 345,097 | 694,890 | 34.6% |
| Site Restoration | 50,998 | 72,770 | 123,768 | 6.2% |
| Total ^[3] | 996,753 | 1,008,829 | 2,005,582 | 100.0% |

^[1] Includes engineering

^[2] Includes costs for the dry storage system components, spent fuel loading and transfer, spent fuel pool O&M and EP fees, but excludes program management costs (staffing), security and other related costs

^[3] Columns may not add due to rounding

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TABLE 6.2
SCENARIO 2: DECON WITH 60 YEAR DFS
DECOMMISSIONING COST ELEMENTS
(thousands of 2020 dollars)

| Cost Element | Unit 1 | Unit 2 | Total | Percentage |
|---|------------------|------------------|------------------|---------------|
| Decontamination | 12,109 | 19,308 | 31,417 | 1.5% |
| Removal | 111,005 | 147,842 | 258,847 | 12.6% |
| Packaging | 27,756 | 28,136 | 55,892 | 2.7% |
| Transportation | 9,509 | 10,116 | 19,625 | 1.0% |
| Waste Disposal | 75,656 | 79,069 | 154,725 | 7.6% |
| Off-site Waste Processing | 26,049 | 30,811 | 56,860 | 2.8% |
| Program Management ^[1] | 241,656 | 229,438 | 471,094 | 23.0% |
| Security | 155,731 | 144,029 | 299,759 | 14.6% |
| Spent Fuel Pool Isolation | 14,576 | 9,718 | 24,294 | 1.2% |
| Spent Fuel Storage (Direct Costs) ^[2] | 116,766 | 113,596 | 230,362 | 11.2% |
| Insurance and Regulatory Fees | 20,622 | 17,563 | 38,185 | 1.9% |
| Energy | 10,742 | 9,033 | 19,775 | 1.0% |
| Characterization and Licensing Surveys | 14,531 | 16,907 | 31,438 | 1.5% |
| Property Taxes | 82,188 | 77,319 | 159,507 | 7.8% |
| Miscellaneous | 7,729 | 7,430 | 15,159 | 0.7% |
| Railroad Track Maintenance | 3,759 | 3,671 | 7,430 | 0.4% |
| Retention and Severance | 26,985 | 26,985 | 53,970 | 2.6% |
| Security Modifications | 5,000 | 5,000 | 10,000 | 0.5% |
| Prairie Island Indian Community Payments | 55,496 | 53,970 | 109,466 | 5.3% |
| Total ^[3] | 1,017,865 | 1,029,941 | 2,047,805 | 100.0% |

| Cost Element | Unit 1 | Unit 2 | Total | Percentage |
|-----------------------------|------------------|------------------|------------------|---------------|
| NRC License Termination | 595,962 | 590,962 | 1,186,924 | 58.0% |
| Spent Fuel Management | 370,904 | 366,208 | 737,113 | 36.0% |
| Site Restoration | 50,998 | 72,770 | 123,768 | 6.0% |
| Total ^[3] | 1,017,865 | 1,029,941 | 2,047,805 | 100.0% |

^[1] Includes engineering

^[2] Includes costs for the dry storage system components, spent fuel loading and transfer, spent fuel pool O&M and EP fees, but excludes program management costs (staffing), security and other related costs

^[3] Columns may not add due to rounding

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TABLE 6.3
SCENARIO 3: DECON WITH 100 YEAR DFS
DECOMMISSIONING COST ELEMENTS
(thousands of 2020 dollars)

| Cost Element | Unit 1 | Unit 2 | Total | Percentage |
|---|------------------|------------------|------------------|---------------|
| Decontamination | 12,109 | 19,308 | 31,417 | 1.0% |
| Removal | 111,707 | 148,543 | 260,249 | 7.9% |
| Packaging | 27,756 | 28,136 | 55,892 | 1.7% |
| Transportation | 9,509 | 10,116 | 19,625 | 0.6% |
| Waste Disposal | 75,656 | 79,069 | 154,724 | 4.7% |
| Off-site Waste Processing | 26,049 | 30,811 | 56,860 | 1.7% |
| Program Management ^[1] | 323,909 | 311,690 | 635,599 | 19.4% |
| Security | 255,921 | 244,219 | 500,140 | 15.2% |
| Spent Fuel Pool Isolation | 14,576 | 9,718 | 24,294 | 0.7% |
| Spent Fuel Storage (Direct Costs) ^[2] | 425,553 | 422,384 | 847,937 | 25.8% |
| Insurance and Regulatory Fees | 31,282 | 28,223 | 59,505 | 1.8% |
| Energy | 10,742 | 9,033 | 19,775 | 0.6% |
| Characterization and Licensing Surveys | 14,531 | 16,907 | 31,438 | 1.0% |
| Property Taxes | 143,057 | 138,187 | 281,244 | 8.6% |
| Miscellaneous | 7,729 | 7,430 | 15,159 | 0.5% |
| Railroad Track Maintenance | 6,637 | 6,549 | 13,185 | 0.4% |
| Retention and Severance | 26,985 | 26,985 | 53,970 | 1.6% |
| Security Modifications | 5,000 | 5,000 | 10,000 | 0.3% |
| Prairie Island Indian Community Payments | 105,493 | 103,966 | 209,459 | 6.4% |
| Total ^[3] | 1,634,199 | 1,646,275 | 3,280,474 | 100.0% |

| Cost Element | Unit 1 | Unit 2 | Total | Percentage |
|-----------------------------|------------------|------------------|------------------|---------------|
| NRC License Termination | 596,408 | 591,409 | 1,187,817 | 36.2% |
| Spent Fuel Management | 985,833 | 981,137 | 1,966,970 | 60.0% |
| Site Restoration | 51,958 | 73,730 | 125,688 | 3.8% |
| Total ^[3] | 1,634,199 | 1,646,275 | 3,280,474 | 100.0% |

^[1] Includes engineering

^[2] Includes costs for the dry storage system components, spent fuel loading and transfer, spent fuel pool O&M and EP fees, but excludes program management costs (staffing), security and other related costs

^[3] Columns may not add due to rounding

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TABLE 6.4
SCENARIO 4: DECON WITH 200 YEAR DFS
DECOMMISSIONING COST ELEMENTS
(thousands of 2020 dollars)

| Cost Element | Unit 1 | Unit 2 | Total | Percentage |
|---|------------------|------------------|------------------|---------------|
| Decontamination | 12,109 | 19,308 | 31,417 | 0.6% |
| Removal | 111,707 | 148,543 | 260,249 | 4.7% |
| Packaging | 27,756 | 28,136 | 55,892 | 1.0% |
| Transportation | 9,509 | 10,116 | 19,625 | 0.4% |
| Waste Disposal | 75,656 | 79,069 | 154,724 | 2.8% |
| Off-site Waste Processing | 26,049 | 30,811 | 56,860 | 1.0% |
| Program Management ^[1] | 468,903 | 456,684 | 925,587 | 16.6% |
| Security | 506,407 | 494,705 | 1,001,112 | 18.0% |
| Spent Fuel Pool Isolation | 14,576 | 9,718 | 24,294 | 0.4% |
| Spent Fuel Storage (Direct Costs) ^[2] | 859,315 | 856,146 | 1,715,461 | 30.8% |
| Insurance and Regulatory Fees | 57,933 | 54,874 | 112,807 | 2.0% |
| Energy | 10,742 | 9,033 | 19,775 | 0.4% |
| Characterization and Licensing Surveys | 14,531 | 16,907 | 31,438 | 0.6% |
| Property Taxes | 295,229 | 290,360 | 585,589 | 10.5% |
| Miscellaneous | 7,729 | 7,430 | 15,159 | 0.3% |
| Railroad Track Maintenance | 13,831 | 13,743 | 27,575 | 0.5% |
| Retention and Severance | 26,985 | 26,985 | 53,970 | 1.0% |
| Security Modifications | 5,000 | 5,000 | 10,000 | 0.2% |
| Prairie Island Indian Community Payments | 230,489 | 228,963 | 459,452 | 8.3% |
| Total ^[3] | 2,774,456 | 2,786,532 | 5,560,987 | 100.0% |

| Cost Element | Unit 1 | Unit 2 | Total | Percentage |
|-----------------------------|------------------|------------------|------------------|---------------|
| NRC License Termination | 596,408 | 591,409 | 1,187,817 | 21.4% |
| Spent Fuel Management | 2,126,089 | 2,121,393 | 4,247,483 | 76.4% |
| Site Restoration | 51,958 | 73,730 | 125,688 | 2.3% |
| Total ^[3] | 2,774,456 | 2,786,532 | 5,560,987 | 100.0% |

^[1] Includes engineering

^[2] Includes costs for the dry storage system components, spent fuel loading and transfer, spent fuel pool O&M and EP fees, but excludes program management costs (staffing), security and other related costs

^[3] Columns may not add due to rounding

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TABLE 6.5
SCENARIO 5: SAFSTOR WITH 42 YEAR DFS
DECOMMISSIONING COST ELEMENTS
(thousands of 2020 dollars)

| Cost Element | Unit 1 | Unit 2 | Total | Percentage |
|---|------------------|------------------|------------------|---------------|
| Decontamination | 8,262 | 17,629 | 25,891 | 1.0% |
| Removal | 118,236 | 154,208 | 272,444 | 10.4% |
| Packaging | 21,286 | 21,654 | 42,940 | 1.6% |
| Transportation | 7,988 | 8,587 | 16,575 | 0.6% |
| Waste Disposal | 59,926 | 62,040 | 121,966 | 4.7% |
| Off-site Waste Processing | 26,624 | 31,387 | 58,012 | 2.2% |
| Program Management ^[1] | 321,644 | 315,246 | 636,891 | 24.4% |
| Security | 216,744 | 170,639 | 387,383 | 14.8% |
| Spent Fuel Pool Isolation | 14,576 | 9,718 | 24,294 | 0.9% |
| Spent Fuel Storage (Direct Costs) ^[2] | 109,664 | 106,495 | 216,159 | 8.3% |
| Insurance and Regulatory Fees | 47,122 | 43,899 | 91,021 | 3.5% |
| Energy | 21,571 | 21,262 | 42,833 | 1.6% |
| Characterization and Licensing Surveys | 15,797 | 18,173 | 33,970 | 1.3% |
| Property Taxes | 214,410 | 209,541 | 423,951 | 16.2% |
| Miscellaneous | 18,316 | 22,688 | 41,004 | 1.6% |
| Railroad Track Maintenance | 4,733 | 4,645 | 9,377 | 0.4% |
| Retention and Severance | 26,985 | 26,985 | 53,970 | 2.1% |
| Security Modifications | 5,000 | 5,000 | 10,000 | 0.4% |
| Prairie Island Indian Community Payments | 51,745 | 50,219 | 101,964 | 3.9% |
| Total ^[3] | 1,310,629 | 1,300,016 | 2,610,645 | 100.0% |

| Cost Element | Unit 1 | Unit 2 | Total | Percentage |
|-----------------------------|------------------|------------------|------------------|---------------|
| NRC License Termination | 970,442 | 944,187 | 1,914,629 | 73.3% |
| Spent Fuel Management | 281,510 | 275,338 | 556,848 | 21.3% |
| Site Restoration | 58,677 | 80,490 | 139,167 | 5.3% |
| Total ^[3] | 1,310,629 | 1,300,016 | 2,610,645 | 100.0% |

^[1] Includes engineering

^[2] Includes costs for the dry storage system components, spent fuel loading and transfer, spent fuel pool O&M and EP fees, but excludes program management costs (staffing), security and other related costs

^[3] Columns may not add due to rounding

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TABLE 6.6
SCENARIO 6: SAFSTOR WITH 60 YEAR DFS
DECOMMISSIONING COST ELEMENTS
(thousands of 2020 dollars)

| Cost Element | Unit 1 | Unit 2 | Total | Percentage |
|---|------------------|------------------|------------------|---------------|
| Decontamination | 8,262 | 17,629 | 25,891 | 1.0% |
| Removal | 118,240 | 154,230 | 272,471 | 10.3% |
| Packaging | 21,286 | 21,654 | 42,940 | 1.6% |
| Transportation | 7,988 | 8,588 | 16,575 | 0.6% |
| Waste Disposal | 59,926 | 62,042 | 121,968 | 4.6% |
| Off-site Waste Processing | 26,624 | 31,387 | 58,012 | 2.2% |
| Program Management ^[1] | 322,356 | 318,247 | 640,604 | 24.2% |
| Security | 218,124 | 180,276 | 398,401 | 15.1% |
| Spent Fuel Pool Isolation | 14,576 | 9,718 | 24,294 | 0.9% |
| Spent Fuel Storage (Direct Costs) ^[2] | 111,541 | 108,372 | 219,913 | 8.3% |
| Insurance and Regulatory Fees | 47,872 | 44,607 | 92,479 | 3.5% |
| Energy | 21,571 | 21,262 | 42,833 | 1.6% |
| Characterization and Licensing Surveys | 15,797 | 18,173 | 33,970 | 1.3% |
| Property Taxes | 218,698 | 213,829 | 432,527 | 16.3% |
| Miscellaneous | 18,316 | 22,688 | 41,004 | 1.5% |
| Railroad Track Maintenance | 4,733 | 4,645 | 9,377 | 0.4% |
| Retention and Severance | 26,985 | 26,985 | 53,970 | 2.0% |
| Security Modifications | 5,000 | 5,000 | 10,000 | 0.4% |
| Prairie Island Indian Community Payments | 55,496 | 53,970 | 109,466 | 4.1% |
| Total ^[3] | 1,323,393 | 1,323,304 | 2,646,697 | 100.0% |

| Cost Element | Unit 1 | Unit 2 | Total | Percentage |
|-----------------------------|------------------|------------------|------------------|---------------|
| NRC License Termination | 968,306 | 952,576 | 1,920,882 | 72.6% |
| Spent Fuel Management | 296,410 | 290,238 | 586,648 | 22.2% |
| Site Restoration | 58,677 | 80,490 | 139,167 | 5.3% |
| Total ^[3] | 1,323,393 | 1,323,304 | 2,646,697 | 100.0% |

^[1] Includes engineering

^[2] Includes costs for the dry storage system components, spent fuel loading and transfer, spent fuel pool O&M and EP fees, but excludes program management costs (staffing), security and other related costs

^[3] Columns may not add due to rounding

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TABLE 6.7
SCENARIO 7: SAFSTOR WITH 100 YEAR DFS
DECOMMISSIONING COST ELEMENTS
(thousands of 2020 dollars)

| Cost Element | Unit 1 | Unit 2 | Total | Percentage |
|---|------------------|------------------|------------------|---------------|
| Decontamination | 8,262 | 17,447 | 25,709 | 0.7% |
| Removal | 119,002 | 155,038 | 274,040 | 7.3% |
| Packaging | 25,596 | 25,964 | 51,560 | 1.4% |
| Transportation | 7,988 | 8,588 | 16,576 | 0.4% |
| Waste Disposal | 59,928 | 62,049 | 121,977 | 3.3% |
| Off-site Waste Processing | 26,624 | 31,387 | 58,012 | 1.5% |
| Program Management ^[1] | 359,684 | 363,609 | 723,293 | 19.3% |
| Security | 279,245 | 272,250 | 551,495 | 14.7% |
| Spent Fuel Pool Isolation | 14,576 | 9,718 | 24,294 | 0.6% |
| Spent Fuel Storage (Direct Costs) ^[2] | 420,010 | 416,736 | 836,746 | 22.3% |
| Insurance and Regulatory Fees | 57,899 | 54,267 | 112,167 | 3.0% |
| Energy | 21,590 | 21,282 | 42,872 | 1.1% |
| Characterization and Licensing Surveys | 15,797 | 18,173 | 33,970 | 0.9% |
| Property Taxes | 278,005 | 273,136 | 551,141 | 14.7% |
| Miscellaneous | 18,316 | 22,688 | 41,004 | 1.1% |
| Railroad Track Maintenance | 6,373 | 6,285 | 12,659 | 0.3% |
| Retention and Severance | 26,985 | 26,985 | 53,970 | 1.4% |
| Security Modifications | 5,000 | 5,000 | 10,000 | 0.3% |
| Prairie Island Indian Community Payments | 105,493 | 103,966 | 209,459 | 5.6% |
| Total ^[3] | 1,856,374 | 1,894,569 | 3,750,943 | 100.0% |

| Cost Element | Unit 1 | Unit 2 | Total | Percentage |
|-----------------------------|------------------|------------------|------------------|---------------|
| NRC License Termination | 963,420 | 983,908 | 1,947,327 | 51.9% |
| Spent Fuel Management | 836,113 | 832,007 | 1,668,119 | 44.5% |
| Site Restoration | 56,842 | 78,655 | 135,496 | 3.6% |
| Total ^[3] | 1,856,374 | 1,894,569 | 3,750,943 | 100.0% |

^[1] Includes engineering costs

^[2] Includes costs for the dry storage system components, spent fuel loading and transfer, spent fuel pool O&M and EP fees, but excludes program management costs (staffing), security and other related costs

^[3] Columns may not add due to rounding

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TABLE 6.8
SCENARIO 8: SAFSTOR WITH 200 YEAR DFS
DECOMMISSIONING COST ELEMENTS
(thousands of 2020 dollars)

| Cost Element | Unit 1 | Unit 2 | Total | Percentage |
|---|------------------|------------------|------------------|---------------|
| Decontamination | 8,262 | 17,447 | 25,709 | 0.4% |
| Removal | 119,002 | 155,038 | 274,040 | 4.6% |
| Packaging | 25,596 | 25,964 | 51,560 | 0.9% |
| Transportation | 7,988 | 8,588 | 16,576 | 0.3% |
| Waste Disposal | 59,928 | 62,049 | 121,977 | 2.0% |
| Off-site Waste Processing | 26,624 | 31,387 | 58,012 | 1.0% |
| Program Management ^[1] | 504,679 | 508,603 | 1,013,282 | 17.0% |
| Security | 501,598 | 494,603 | 996,201 | 16.7% |
| Spent Fuel Pool Isolation | 14,576 | 9,718 | 24,294 | 0.4% |
| Spent Fuel Storage (Direct Costs) ^[2] | 853,529 | 850,323 | 1,703,853 | 28.5% |
| Insurance and Regulatory Fees | 84,550 | 80,918 | 165,469 | 2.8% |
| Energy | 21,590 | 21,282 | 42,872 | 0.7% |
| Characterization and Licensing Surveys | 15,797 | 18,173 | 33,970 | 0.6% |
| Property Taxes | 430,177 | 425,308 | 855,485 | 14.3% |
| Miscellaneous | 18,316 | 22,688 | 41,004 | 0.7% |
| Railroad Track Maintenance | 13,568 | 13,480 | 27,048 | 0.5% |
| Retention and Severance | 26,985 | 26,985 | 53,970 | 0.9% |
| Security Modifications | 5,000 | 5,000 | 10,000 | 0.2% |
| Prairie Island Indian Community Payments | 230,489 | 228,963 | 459,452 | 7.7% |
| Total ^[3] | 2,968,256 | 3,006,518 | 5,974,774 | 100.0% |

| Cost Element | Unit 1 | Unit 2 | Total | Percentage |
|-----------------------------|------------------|------------------|------------------|---------------|
| NRC License Termination | 963,419 | 983,907 | 1,947,327 | 32.6% |
| Spent Fuel Management | 1,947,994 | 1,943,956 | 3,891,950 | 65.1% |
| Site Restoration | 56,842 | 78,655 | 135,496 | 2.3% |
| Total ^[3] | 2,968,256 | 3,006,518 | 5,974,774 | 100.0% |

^[1] Includes engineering costs

^[2] Includes costs for the dry storage system components, spent fuel loading and transfer, spent fuel pool O&M and EP fees, but excludes program management costs (staffing), security and other related costs

^[3] Columns may not add due to rounding

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44. "Microsoft Project Professional 2016," Microsoft Corporation, Redmond, WA
45. "Atomic Energy Act of 1954," (68 Stat. 919) [\[Open\]](#)

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APPENDIX A

UNIT COST FACTOR DEVELOPMENT

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UNIT COST FACTOR DEVELOPMENT**

Example: Unit Factor for Removal of Contaminated Heat Exchanger < 3,000 lbs.

1. SCOPE

Heat exchangers weighing < 3,000 lbs. will be removed in one piece using a crane or small hoist. They will be disconnected from the inlet and outlet piping. The heat exchanger will be sent to the waste processing area.

2. CALCULATIONS

| Act ID | Activity Description | Activity Duration (minutes) | Critical Duration (minutes)* |
|---|---|-----------------------------|------------------------------|
| a | Remove insulation | 60 | (b) |
| b | Mount pipe cutters | 60 | 60 |
| c | Install contamination controls | 20 | (b) |
| d | Disconnect inlet and outlet lines | 60 | 60 |
| e | Cap openings | 20 | (d) |
| f | Rig for removal | 30 | 30 |
| g | Unbolt from mounts | 30 | 30 |
| h | Remove contamination controls | 15 | 15 |
| i | Remove, wrap, send to waste processing area | <u>60</u> | <u>60</u> |
| Totals (Activity/Critical) | | 355 | 255 |
| Duration adjustment(s): | | | |
| + Respiratory protection adjustment (50 of critical duration) | | | 128 |
| + Radiation/ALARA adjustment (37.1 of critical duration) | | | <u>95</u> |
| Adjusted work duration | | | 478 |
| + Protective clothing adjustment (30 of adjusted duration) | | | <u>143</u> |
| Productive work duration | | | 621 |
| + Work break adjustment (8.33 of productive duration) | | | <u>52</u> |
| Total work duration (minutes) | | | 673 |

***** Total duration = 11.217 hr *****

* alpha designators indicate activities that can be performed in parallel

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(continued)****3. LABOR REQUIRED**

| Crew | Number | Duration (hours) | Rate (\$/hr) | Cost |
|---------------------------|--------|---------------------|-----------------|-----------------|
| Laborers | 3.00 | 11.217 | \$61.19 | \$2,059.10 |
| Craftsmen | 2.00 | 11.217 | \$76.98 | \$1,726.97 |
| Foreman | 1.00 | 11.217 | \$80.56 | \$903.64 |
| General Foreman | 0.25 | 11.217 | \$82.83 | \$232.28 |
| Fire Watch | 0.05 | 11.217 | \$61.19 | \$34.32 |
| Health Physics Technician | 1.00 | 11.217 | \$53.89 | <u>\$604.48</u> |
| Total Labor Cost | | | | \$5,560.79 |

4. EQUIPMENT & CONSUMABLES COSTS

| | |
|--|---|
| Equipment Costs | none |
| Consumables/Materials Costs | |
| <ul style="list-style-type: none"> • Universal Sorbent 50 @ \$0.63 sq ft ^{1} • Tarpaulins (oil resistant/fire retardant) 50 @ \$0.47/sq ft ^{2} • Gas torch consumables 1 @ \$20.79/hr x 1 hr ^{3} | <p>\$31.50</p> <p>\$23.50</p> <p><u>\$20.79</u></p> |
| Subtotal cost of equipment and materials | \$75.79 |
| Overhead & profit on equipment and materials @ 16.88% | <u>\$12.79</u> |
| Total costs, equipment & material | \$88.58 |

TOTAL COST:

| | |
|--|-------------------|
| Removal of contaminated heat exchanger <3000 pounds: | \$5,649.37 |
| Total labor cost: | \$5,560.79 |
| Total equipment/material costs: | \$88.58 |
| Total craft labor man-hours required per unit: | 81.88 |

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5. NOTES AND REFERENCES

- Work difficulty factors were developed in conjunction with the Atomic Industrial Forum's (now NEI) program to standardize nuclear decommissioning cost estimates and are delineated in Volume 1, Chapter 5 of the "Guidelines for Producing Commercial Nuclear Power Plant Decommissioning Cost Estimates," AIF/NESP-036, May 1986.
- References for equipment & consumables costs:
 1. www.mcmaster.com online catalog, McMaster Carr Spill Control (7193T88)
 2. R.S. Means (2020) Division 01 56, Section 13.60-0600, page 23
 3. R.S. Means (2020) Division 01 54 33, Section 40-6360, page 736
- Material and consumable costs were adjusted using the regional indices for Minneapolis, Minnesota.

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APPENDIX B

**UNIT COST FACTOR LISTING
(DECON: Power Block Structures Only)**

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Appendix B, Page 2 of 7****APPENDIX B****UNIT COST FACTOR LISTING
(Power Block Structures Only)**

| Unit Cost Factor | Cost/Unit |
|---|------------------|
| Removal of clean instrument and sampling tubing, \$/linear foot | 0.66 |
| Removal of clean pipe 0.25 to 2 inches diameter, \$/linear foot | 7.12 |
| Removal of clean pipe >2 to 4 inches diameter, \$/linear foot | 10.11 |
| Removal of clean pipe >4 to 8 inches diameter, \$/linear foot | 19.57 |
| Removal of clean pipe >8 to 14 inches diameter, \$/linear foot | 37.91 |
| Removal of clean pipe >14 to 20 inches diameter, \$/linear foot | 49.31 |
| Removal of clean pipe >20 to 36 inches diameter, \$/linear foot | 72.55 |
| Removal of clean pipe >36 inches diameter, \$/linear foot | 86.19 |
| Removal of clean valve >2 to 4 inches | 129.76 |
| Removal of clean valve >4 to 8 inches | 195.71 |
| Removal of clean valve >8 to 14 inches | 379.11 |
| Removal of clean valve >14 to 20 inches | 493.15 |
| Removal of clean valve >20 to 36 inches | 725.51 |
| Removal of clean valve >36 inches | 861.88 |
| Removal of clean pipe hanger for small bore piping | 44.86 |
| Removal of clean pipe hanger for large bore piping | 160.36 |
| Removal of clean pump, <300 pound | 330.75 |
| Removal of clean pump, 300-1000 pound | 912.91 |
| Removal of clean pump, 1000-10,000 pound | 3,610.60 |
| Removal of clean pump, >10,000 pound | 6,985.07 |
| Removal of clean pump motor, 300-1000 pound | 381.58 |
| Removal of clean pump motor, 1000-10,000 pound | 1,500.12 |
| Removal of clean pump motor, >10,000 pound | 3,375.27 |
| Removal of clean heat exchanger <3000 pound | 1,938.88 |
| Removal of clean heat exchanger >3000 pound | 4,883.83 |
| Removal of clean feedwater heater/deaerator | 13,767.02 |
| Removal of clean moisture separator/reheater | 28,301.27 |
| Removal of clean tank, <300 gallons | 425.41 |
| Removal of clean tank, 300-3000 gallon | 1,340.19 |
| Removal of clean tank, >3000 gallons, \$/square foot surface area | 11.21 |

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Appendix B, Page 3 of 7****APPENDIX B****UNIT COST FACTOR LISTING
(Power Block Structures Only)**

| Unit Cost Factor | Cost/Unit |
|--|------------------|
| Removal of clean electrical equipment, <300 pound | 179.24 |
| Removal of clean electrical equipment, 300-1000 pound | 621.24 |
| Removal of clean electrical equipment, 1000-10,000 pound | 1,242.49 |
| Removal of clean electrical equipment, >10,000 pound | 2,945.34 |
| Removal of clean electrical transformer < 30 tons | 2,045.49 |
| Removal of clean electrical transformer > 30 tons | 5,890.69 |
| Removal of clean standby diesel generator, <100 kW | 2,089.30 |
| Removal of clean standby diesel generator, 100 kW to 1 MW | 4,663.46 |
| Removal of clean standby diesel generator, >1 MW | 9,654.30 |
| Removal of clean electrical cable tray, \$/linear foot | 16.85 |
| Removal of clean electrical conduit, \$/linear foot | 7.36 |
| Removal of clean mechanical equipment, <300 pound | 179.24 |
| Removal of clean mechanical equipment, 300-1000 pound | 621.24 |
| Removal of clean mechanical equipment, 1000-10,000 pound | 1,242.49 |
| Removal of clean mechanical equipment, >10,000 pound | 2,945.34 |
| Removal of clean HVAC equipment, <300 pound | 216.74 |
| Removal of clean HVAC equipment, 300-1000 pound | 746.48 |
| Removal of clean HVAC equipment, 1000-10,000 pound | 1,487.73 |
| Removal of clean HVAC equipment, >10,000 pound | 2,945.34 |
| Removal of clean HVAC ductwork, \$/pound | 0.70 |
| Removal of contaminated instrument and sampling tubing, \$/linear foot | 1.95 |
| Removal of contaminated pipe 0.25 to 2 inches diameter, \$/linear foot | 27.83 |
| Removal of contaminated pipe >2 to 4 inches diameter, \$/linear foot | 47.82 |
| Removal of contaminated pipe >4 to 8 inches diameter, \$/linear foot | 74.97 |
| Removal of contaminated pipe >8 to 14 inches diameter, \$/linear foot | 148.05 |
| Removal of contaminated pipe >14 to 20 inches diameter, \$/linear foot | 177.91 |
| Removal of contaminated pipe >20 to 36 inches diameter, \$/linear foot | 246.21 |
| Removal of contaminated pipe >36 inches diameter, \$/linear foot | 290.98 |
| Removal of contaminated valve >2 to 4 inches | 566.48 |
| Removal of contaminated valve >4 to 8 inches | 683.58 |

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| Unit Cost Factor | Cost/Unit |
|---|------------------|
| Removal of contaminated valve >8 to 14 inches | 1,416.26 |
| Removal of contaminated valve >14 to 20 inches | 1,800.59 |
| Removal of contaminated valve >20 to 36 inches | 2,397.86 |
| Removal of contaminated valve >36 inches | 2,845.51 |
| Removal of contaminated pipe hanger for small bore piping | 185.80 |
| Removal of contaminated pipe hanger for large bore piping | 626.86 |
| Removal of contaminated pump, <300 pound | 1,220.24 |
| Removal of contaminated pump, 300-1000 pound | 2,838.77 |
| Removal of contaminated pump, 1000-10,000 pound | 9,387.15 |
| Removal of contaminated pump, >10,000 pound | 22,866.23 |
| Removal of contaminated pump motor, 300-1000 pound | 1,207.55 |
| Removal of contaminated pump motor, 1000-10,000 pound | 3,819.10 |
| Removal of contaminated pump motor, >10,000 pound | 8,574.33 |
| Removal of contaminated heat exchanger <3000 pound | 5,649.37 |
| Removal of contaminated heat exchanger >3000 pound | 16,380.03 |
| Removal of contaminated tank, <300 gallons | 2,028.43 |
| Removal of contaminated tank, >300 gallons, \$/square foot | 39.80 |
| Removal of contaminated electrical equipment, <300 pound | 945.74 |
| Removal of contaminated electrical equipment, 300-1000 pound | 2,314.59 |
| Removal of contaminated electrical equipment, 1000-10,000 pound | 4,458.19 |
| Removal of contaminated electrical equipment, >10,000 pound | 8,760.92 |
| Removal of contaminated electrical cable tray, \$/linear foot | 45.77 |
| Removal of contaminated electrical conduit, \$/linear foot | 22.38 |
| Removal of contaminated mechanical equipment, <300 pound | 1,052.10 |
| Removal of contaminated mechanical equipment, 300-1000 pound | 2,556.07 |
| Removal of contaminated mechanical equipment, 1000-10,000 pound | 4,915.22 |
| Removal of contaminated mechanical equipment, >10,000 pound | 8,760.92 |
| Removal of contaminated HVAC equipment, <300 pound | 1,052.10 |
| Removal of contaminated HVAC equipment, 300-1000 pound | 2,556.07 |
| Removal of contaminated HVAC equipment, 1000-10,000 pound | 4,915.22 |

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| Unit Cost Factor | Cost/Unit |
|---|------------------|
| Removal of contaminated HVAC equipment, >10,000 pound | 8,760.92 |
| Removal of contaminated HVAC ductwork, \$/pound | 2.68 |
| Removal/plasma arc cut of contaminated thin metal components, \$/linear in. | 5.12 |
| Additional decontamination of surface by washing, \$/square foot | 10.44 |
| Additional decontamination of surfaces by hydrolasing, \$/square foot | 45.13 |
| Decontamination rig hook up and flush, \$/ 250 foot length | 8,868.24 |
| Chemical flush of components/systems, \$/gallon | 21.45 |
| Removal of clean standard reinforced concrete, \$/cubic yard | 79.61 |
| Removal of grade slab concrete, \$/cubic yard | 90.55 |
| Removal of clean concrete floors, \$/cubic yard | 462.49 |
| Removal of sections of clean concrete floors, \$/cubic yard | 1,391.41 |
| Removal of clean heavily rein concrete w/#9 rebar, \$/cubic yard | 115.01 |
| Removal of contaminated heavily rein concrete w/#9 rebar, \$/cubic yard | 2,710.44 |
| Removal of clean heavily rein concrete w/#18 rebar, \$/cubic yard | 155.87 |
| Removal of contaminated heavily rein concrete w/#18 rebar, \$/cubic yard | 3,585.77 |
| Removal heavily rein concrete w/#18 rebar & steel embedments, \$/cubic yard | 569.09 |
| Removal of below-grade suspended floors, \$/cubic yard | 218.61 |
| Removal of clean monolithic concrete structures, \$/cubic yard | 1,160.53 |
| Removal of contaminated monolithic concrete structures, \$/cubic yard | 2,698.05 |
| Removal of clean foundation concrete, \$/cubic yard | 910.88 |
| Removal of contaminated foundation concrete, \$/cubic yard | 2,513.39 |
| Explosive demolition of bulk concrete, \$/cubic yard | 61.22 |
| Removal of clean hollow masonry block wall, \$/cubic yard | 27.85 |
| Removal of contaminated hollow masonry block wall, \$/cubic yard | 72.43 |
| Removal of clean solid masonry block wall, \$/cubic yard | 27.85 |
| Removal of contaminated solid masonry block wall, \$/cubic yard | 72.43 |
| Backfill of below-grade voids, \$/cubic yard | 36.73 |
| Removal of subterranean tunnels/voids, \$/linear foot | 143.29 |
| Placement of concrete for below-grade voids, \$/cubic yard | 142.84 |
| Excavation of clean material, \$/cubic yard | 3.38 |

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| Unit Cost Factor | Cost/Unit |
|---|------------------|
| Excavation of contaminated material, \$/cubic yard | 48.85 |
| Removal of clean concrete rubble (tipping fee included), \$/cubic yard | 28.06 |
| Removal of contaminated concrete rubble, \$/cubic yard | 30.63 |
| Removal of building by volume, \$/cubic foot | 0.35 |
| Removal of clean building metal siding, \$/square foot | 1.77 |
| Removal of contaminated building metal siding, \$/square foot | 5.62 |
| Removal of standard asphalt roofing, \$/square foot | 3.11 |
| Removal of transite panels, \$/square foot | 2.87 |
| Scarifying contaminated concrete surfaces (drill & spall), \$/square foot | 15.31 |
| Scabbling contaminated concrete floors, \$/square foot | 9.92 |
| Scabbling contaminated concrete walls, \$/square foot | 26.57 |
| Scabbling contaminated ceilings, \$/square foot | 91.53 |
| Scabbling structural steel, \$/square foot | 7.86 |
| Removal of clean overhead crane/monorail < 10 ton capacity | 863.80 |
| Removal of contaminated overhead crane/monorail < 10 ton capacity | 2,333.62 |
| Removal of clean overhead crane/monorail >10-50 ton capacity | 2,073.11 |
| Removal of contaminated overhead crane/monorail >10-50 ton capacity | 5,599.73 |
| Removal of polar crane > 50 ton capacity | 8,638.20 |
| Removal of gantry crane > 50 ton capacity | 32,889.62 |
| Removal of structural steel, \$/pound | 0.25 |
| Removal of clean steel floor grating, \$/square foot | 6.20 |
| Removal of contaminated steel floor grating, \$/square foot | 17.35 |
| Removal of clean free standing steel liner, \$/square foot | 16.81 |
| Removal of contaminated free standing steel liner, \$/square foot | 46.59 |
| Removal of clean concrete-anchored steel liner, \$/square foot | 8.40 |
| Removal of contaminated concrete-anchored steel liner, \$/square foot | 54.30 |
| Placement of scaffolding in clean areas, \$/square foot | 18.98 |
| Placement of scaffolding in contaminated areas, \$/square foot | 31.88 |
| Landscaping with topsoil, \$/acre | 25,606.43 |
| Cost of CPC B-88 LSA box & preparation for use | 2,185.35 |

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(Power Block Structures Only)**

| Unit Cost Factor | Cost/Unit |
|--|------------------|
| Cost of CPC B-25 LSA box & preparation for use | 1,785.70 |
| Cost of CPC B-12V 12 gauge LSA box & preparation for use | 1,711.40 |
| Cost of CPC B-144 LSA box & preparation for use | 10,802.18 |
| Cost of LSA drum & preparation for use | 260.77 |
| Cost of cask liner for CNSI 8 120A cask (resins) | 12,915.06 |
| Cost of cask liner for CNSI 8 120A cask (filters) | 9,404.10 |
| Decontamination of surfaces with vacuuming, \$/square foot | 1.04 |

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APPENDIX C

DETAILED COST ANALYSIS

SCENARIO 1: DECON with 42 Year DFS

| | <u>Page</u> |
|---|-------------|
| Prairie Island Nuclear Generating Plant, Unit 1 | C-2 |
| Prairie Island Nuclear Generating Plant, Unit 2 | C-12 |

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**Table C-1
Prairie Island DECON Unit 1
DECON Decommissioning Cost Estimate with DOE Pickup of Industry Spent Fuel Starting in 2035
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial/Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|--|--|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|----------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| PERIOD 1a - Shutdown through Transition | | | | | | | | | | | | | | | | | | | | | |
| Period 1a Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| 1a.1.1 | Prepare preliminary decommissioning cost | - | - | - | - | - | - | 167 | 25 | 192 | 192 | - | - | - | - | - | - | - | - | - | 1,300 |
| 1a.1.2 | Notification of Cessation of Operations | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.3 | Remove fuel & source material | - | - | - | - | - | - | - | - | n/a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.4 | Notification of Permanent Defueling | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.5 | Deactivate plant systems & process waste | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.6 | Prepare and submit PSDAR | - | - | - | - | - | - | 257 | 39 | 296 | 296 | - | - | - | - | - | - | - | - | - | 2,000 |
| 1a.1.7 | Review plant dwgs & specs. | - | - | - | - | - | - | 591 | 89 | 680 | 680 | - | - | - | - | - | - | - | - | - | 4,600 |
| 1a.1.8 | Perform detailed rad survey | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.9 | Estimate by-product inventory | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| 1a.1.10 | End product description | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| 1a.1.11 | Detailed by-product inventory | - | - | - | - | - | - | 167 | 25 | 192 | 192 | - | - | - | - | - | - | - | - | - | 1,300 |
| 1a.1.12 | Define major work sequence | - | - | - | - | - | - | 964 | 145 | 1,108 | 1,108 | - | - | - | - | - | - | - | - | - | 7,500 |
| 1a.1.13 | Perform SER and EA | - | - | - | - | - | - | 398 | 60 | 458 | 458 | - | - | - | - | - | - | - | - | - | 3,100 |
| 1a.1.14 | Prepare/submit Defueled Technical Specifications | - | - | - | - | - | - | 964 | 145 | 1,108 | 1,108 | - | - | - | - | - | - | - | - | - | 7,500 |
| 1a.1.15 | Perform Site-Specific Cost Study | - | - | - | - | - | - | 643 | 96 | 739 | 739 | - | - | - | - | - | - | - | - | - | 5,000 |
| 1a.1.16 | Prepare/submit Irradiated Fuel Management Plan | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| Activity Specifications | | | | | | | | | | | | | | | | | | | | | |
| 1a.1.17.1 | Plant & temporary facilities | - | - | - | - | - | - | 632 | 95 | 727 | 654 | - | 73 | - | - | - | - | - | - | - | 4,920 |
| 1a.1.17.2 | Plant systems | - | - | - | - | - | - | 536 | 80 | 616 | 554 | - | 62 | - | - | - | - | - | - | - | 4,167 |
| 1a.1.17.3 | NSSS Decontamination Flush | - | - | - | - | - | - | 64 | 10 | 74 | 74 | - | - | - | - | - | - | - | - | - | 500 |
| 1a.1.17.4 | Reactor internals | - | - | - | - | - | - | 912 | 137 | 1,049 | 1,049 | - | - | - | - | - | - | - | - | - | 7,100 |
| 1a.1.17.5 | Reactor vessel | - | - | - | - | - | - | 835 | 125 | 961 | 961 | - | - | - | - | - | - | - | - | - | 6,500 |
| 1a.1.17.6 | Biological shield | - | - | - | - | - | - | 64 | 10 | 74 | 74 | - | - | - | - | - | - | - | - | - | 500 |
| 1a.1.17.7 | Steam generators | - | - | - | - | - | - | 401 | 60 | 461 | 461 | - | - | - | - | - | - | - | - | - | 3,120 |
| 1a.1.17.8 | Reinforced concrete | - | - | - | - | - | - | 206 | 31 | 236 | 118 | - | 118 | - | - | - | - | - | - | - | 1,600 |
| 1a.1.17.9 | Main Turbine | - | - | - | - | - | - | 51 | 8 | 59 | - | - | 59 | - | - | - | - | - | - | - | 400 |
| 1a.1.17.10 | Main Condensers | - | - | - | - | - | - | 51 | 8 | 59 | - | - | 59 | - | - | - | - | - | - | - | 400 |
| 1a.1.17.11 | Plant structures & buildings | - | - | - | - | - | - | 401 | 60 | 461 | 231 | - | 231 | - | - | - | - | - | - | - | 3,120 |
| 1a.1.17.12 | Waste management | - | - | - | - | - | - | 591 | 89 | 680 | 680 | - | - | - | - | - | - | - | - | - | 4,600 |
| 1a.1.17.13 | Facility & site closeout | - | - | - | - | - | - | 116 | 17 | 133 | 67 | - | 67 | - | - | - | - | - | - | - | 900 |
| 1a.1.17 | Total | - | - | - | - | - | - | 4,861 | 729 | 5,591 | 4,923 | - | 668 | - | - | - | - | - | - | - | 37,827 |
| Planning & Site Preparations | | | | | | | | | | | | | | | | | | | | | |
| 1a.1.18 | Prepare dismantling sequence | - | - | - | - | - | - | 308 | 46 | 355 | 355 | - | - | - | - | - | - | - | - | - | 2,400 |
| 1a.1.19 | Plant prep. & temp. svces | - | - | - | - | - | - | 3,500 | 525 | 4,025 | 4,025 | - | - | - | - | - | - | - | - | - | - |
| 1a.1.20 | Design water clean-up system | - | - | - | - | - | - | 180 | 27 | 207 | 207 | - | - | - | - | - | - | - | - | - | 1,400 |
| 1a.1.21 | Rigging/Cont. Cntrl Envlps/tooling/etc. | - | - | - | - | - | - | 2,400 | 360 | 2,760 | 2,760 | - | - | - | - | - | - | - | - | - | - |
| 1a.1.22 | Procure casks/liners & containers | - | - | - | - | - | - | 158 | 24 | 182 | 182 | - | - | - | - | - | - | - | - | - | 1,230 |
| 1a.1 | Subtotal Period 1a Activity Costs | - | - | - | - | - | - | 15,945 | 2,392 | 18,336 | 17,669 | - | 668 | - | - | - | - | - | - | - | 78,157 |
| Period 1a Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 1a.2.1 | Spent Fuel Pool Isolation | - | - | - | - | - | - | 12,675 | 1,901 | 14,576 | 14,576 | - | - | - | - | - | - | - | - | - | - |
| 1a.2 | Subtotal Period 1a Additional Costs | - | - | - | - | - | - | 12,675 | 1,901 | 14,576 | 14,576 | - | - | - | - | - | - | - | - | - | - |
| Period 1a Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 1a.3.1 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 1,249 | - | 1,249 | - | 1,249 | - | - | - | - | - | - | - | - | - |
| 1a.3 | Subtotal Period 1a Collateral Costs | - | - | - | - | - | - | 1,249 | - | 1,249 | - | 1,249 | - | - | - | - | - | - | - | - | - |
| Period 1a Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 1a.4.1 | Insurance | - | - | - | - | - | - | 1,660 | 166 | 1,826 | 1,826 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.2 | Property taxes | - | - | - | - | - | - | 3,623 | 362 | 3,985 | 3,985 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.3 | Health physics supplies | - | 614 | - | - | - | - | - | 153 | 767 | 767 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.4 | Heavy equipment rental | - | 753 | - | - | - | - | - | 113 | 866 | 866 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.5 | Disposal of DAW generated | - | - | 12 | 5 | - | 50 | - | 14 | 82 | 82 | - | - | 610 | - | - | - | - | 12,190 | 20 | - |
| 1a.4.6 | Plant energy budget | - | - | - | - | - | - | 1,621 | 243 | 1,864 | 1,864 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.7 | NRC Fees | - | - | - | - | - | - | 1,137 | 114 | 1,251 | 1,251 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.8 | Emergency Planning Fees | - | - | - | - | - | - | 2,174 | 217 | 2,392 | - | 2,392 | - | - | - | - | - | - | - | - | - |
| 1a.4.9 | Fixed Overhead | - | - | - | - | - | - | 1,440 | 216 | 1,656 | 1,656 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.10 | Spent Fuel Pool O&M | - | - | - | - | - | - | 422 | 63 | 486 | - | 486 | - | - | - | - | - | - | - | - | - |
| 1a.4.11 | ISFSI Operating Costs | - | - | - | - | - | - | 56 | 8 | 64 | - | 64 | - | - | - | - | - | - | - | - | - |
| 1a.4.12 | Railroad Track Maintenance | - | - | - | - | - | - | 63 | 9 | 72 | 72 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.13 | Security Staff Cost | - | - | - | - | - | - | 8,328 | 1,249 | 9,577 | 9,577 | - | - | - | - | - | - | - | - | - | 122,720 |
| 1a.4.14 | Utility Staff Cost | - | - | - | - | - | - | 26,931 | 4,040 | 30,971 | 30,971 | - | - | - | - | - | - | - | - | - | 422,240 |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table C-1
Prairie Island DECON Unit 1
DECON Decommissioning Cost Estimate with DOE Pickup of Industry Spent Fuel Starting in 2035
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial/Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|--|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|----------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| 1a.4 | Subtotal Period 1a Period-Dependent Costs | - | 1,367 | 12 | 5 | - | 50 | 47,456 | 6,970 | 55,860 | 52,918 | 2,942 | - | - | 610 | - | - | - | 12,190 | 20 | 544,960 |
| 1a.0 | TOTAL PERIOD 1a COST | - | 1,367 | 12 | 5 | - | 50 | 77,325 | 11,263 | 90,022 | 85,163 | 4,191 | 668 | - | 610 | - | - | - | 12,190 | 20 | 623,117 |
| PERIOD 1b - Decommissioning Preparations | | | | | | | | | | | | | | | | | | | | | |
| Period 1b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| Detailed Work Procedures | | | | | | | | | | | | | | | | | | | | | |
| 1b.1.1.1 | Plant systems | - | - | - | - | - | - | 608 | 91 | 700 | 630 | - | 70 | - | - | - | - | - | - | - | 4,733 |
| 1b.1.1.2 | NSSS Decontamination Flush | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| 1b.1.1.3 | Reactor internals | - | - | - | - | - | - | 321 | 48 | 369 | 369 | - | - | - | - | - | - | - | - | - | 2,500 |
| 1b.1.1.4 | Remaining buildings | - | - | - | - | - | - | 174 | 26 | 200 | 50 | - | 150 | - | - | - | - | - | - | - | 1,350 |
| 1b.1.1.5 | CRD cooling assembly | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| 1b.1.1.6 | CRD housings & ICI tubes | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| 1b.1.1.7 | Incore instrumentation | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| 1b.1.1.8 | Reactor vessel | - | - | - | - | - | - | 467 | 70 | 537 | 537 | - | - | - | - | - | - | - | - | - | 3,630 |
| 1b.1.1.9 | Facility closeout | - | - | - | - | - | - | 154 | 23 | 177 | 89 | - | 89 | - | - | - | - | - | - | - | 1,200 |
| 1b.1.1.10 | Missile shields | - | - | - | - | - | - | 58 | 9 | 67 | 67 | - | - | - | - | - | - | - | - | - | 450 |
| 1b.1.1.11 | Biological shield | - | - | - | - | - | - | 154 | 23 | 177 | 177 | - | - | - | - | - | - | - | - | - | 1,200 |
| 1b.1.1.12 | Steam generators | - | - | - | - | - | - | 591 | 89 | 680 | 680 | - | - | - | - | - | - | - | - | - | 4,600 |
| 1b.1.1.13 | Reinforced concrete | - | - | - | - | - | - | 129 | 19 | 148 | 74 | - | 74 | - | - | - | - | - | - | - | 1,000 |
| 1b.1.1.14 | Main Turbine | - | - | - | - | - | - | 200 | 30 | 231 | - | - | 231 | - | - | - | - | - | - | - | 1,560 |
| 1b.1.1.15 | Main Condensers | - | - | - | - | - | - | 200 | 30 | 231 | - | - | 231 | - | - | - | - | - | - | - | 1,560 |
| 1b.1.1.16 | Auxiliary building | - | - | - | - | - | - | 351 | 53 | 403 | 363 | - | 40 | - | - | - | - | - | - | - | 2,730 |
| 1b.1.1.17 | Reactor building | - | - | - | - | - | - | 351 | 53 | 403 | 363 | - | 40 | - | - | - | - | - | - | - | 2,730 |
| 1b.1.1 | Total | - | - | - | - | - | - | 4,272 | 641 | 4,913 | 3,989 | - | 924 | - | - | - | - | - | - | - | 33,243 |
| 1b.1.2 | Decon primary loop | 572 | - | - | - | - | - | - | 286 | 859 | 859 | - | - | - | - | - | - | - | - | 1,067 | - |
| 1b.1 | Subtotal Period 1b Activity Costs | 572 | - | - | - | - | - | 4,272 | 927 | 5,772 | 4,848 | - | 924 | - | - | - | - | - | - | 1,067 | 33,243 |
| Period 1b Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 1b.2.1 | Site Characterization | - | - | - | - | - | - | 3,520 | 1,056 | 4,576 | 4,576 | - | - | - | - | - | - | - | - | 21,020 | 8,332 |
| 1b.2.2 | Mixed/Hazardous Waste | - | - | 353 | 94 | 178 | - | - | 76 | 702 | 702 | - | - | 6,132 | - | - | - | - | 351,977 | 2,348 | - |
| 1b.2.3 | Asbestos Abatement | - | 2,526 | 3 | 150 | - | 1,369 | - | 996 | 5,044 | 5,044 | - | - | - | 12,843 | - | - | - | 166,959 | 20,907 | - |
| 1b.2 | Subtotal Period 1b Additional Costs | - | 2,526 | 356 | 244 | 178 | 1,369 | 3,520 | 2,129 | 10,321 | 10,321 | - | - | 6,132 | 12,843 | - | - | - | 518,936 | 44,275 | 8,332 |
| Period 1b Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 1b.3.1 | Decon equipment | 1,055 | - | - | - | - | - | - | 158 | 1,213 | 1,213 | - | - | - | - | - | - | - | - | - | - |
| 1b.3.2 | DOC staff relocation expenses | - | - | - | - | - | - | 1,264 | 190 | 1,454 | 1,454 | - | - | - | - | - | - | - | - | - | - |
| 1b.3.3 | Process decommissioning water waste | 25 | - | 16 | 29 | - | 66 | - | 35 | 172 | 172 | - | - | - | 152 | - | - | - | 9,127 | 30 | - |
| 1b.3.4 | Process decommissioning chemical flush waste | 2 | - | 61 | 199 | - | 3,889 | - | 1,009 | 5,159 | 5,159 | - | - | - | - | 588 | - | - | 62,689 | 110 | - |
| 1b.3.5 | Small tool allowance | - | 36 | - | - | - | - | - | 5 | 42 | 42 | - | - | - | - | - | - | - | - | - | - |
| 1b.3.6 | Pipe cutting equipment | - | 1,200 | - | - | - | - | - | 180 | 1,380 | 1,380 | - | - | - | - | - | - | - | - | - | - |
| 1b.3.7 | Decon rig | 2,104 | - | - | - | - | - | - | 316 | 2,419 | 2,419 | - | - | - | - | - | - | - | - | - | - |
| 1b.3.8 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 163 | 25 | 188 | - | 188 | - | - | - | - | - | - | - | - | - |
| 1b.3.9 | Retention and Severance | - | - | - | - | - | - | 1,032 | 155 | 1,187 | 1,187 | - | - | - | - | - | - | - | - | - | - |
| 1b.3.10 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 623 | - | 623 | - | 623 | - | - | - | - | - | - | - | - | - |
| 1b.3 | Subtotal Period 1b Collateral Costs | 3,185 | 1,236 | 77 | 228 | - | 3,955 | 3,082 | 2,072 | 13,836 | 13,025 | 811 | - | - | 152 | 588 | - | - | 71,815 | 140 | - |
| Period 1b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 1b.4.1 | Decon supplies | 38 | - | - | - | - | - | - | 9 | 47 | 47 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.2 | Insurance | - | - | - | - | - | - | - | 83 | 910 | 910 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.3 | Property taxes | - | - | - | - | - | - | 1,806 | 181 | 1,987 | 1,987 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.4 | Health physics supplies | - | 475 | - | - | - | - | - | 119 | 594 | 594 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.5 | Heavy equipment rental | - | 375 | - | - | - | - | - | 56 | 432 | 432 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.6 | Disposal of DAW generated | - | - | 7 | 3 | - | 29 | - | 8 | 48 | 48 | - | - | - | 356 | - | - | - | 7,122 | 12 | - |
| 1b.4.7 | Plant energy budget | - | - | - | - | - | - | 1,617 | 243 | 1,859 | 1,859 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.8 | NRC Fees | - | - | - | - | - | - | 323 | 32 | 355 | 355 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.9 | Emergency Planning Fees | - | - | - | - | - | - | 1,084 | 108 | 1,193 | - | 1,193 | - | - | - | - | - | - | - | - | - |
| 1b.4.10 | Fixed Overhead | - | - | - | - | - | - | 718 | 108 | 826 | 826 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.11 | Spent Fuel Pool O&M | - | - | - | - | - | - | 211 | 32 | 242 | - | 242 | - | - | - | - | - | - | - | - | - |
| 1b.4.12 | ISFSI Operating Costs | - | - | - | - | - | - | 28 | 4 | 32 | - | 32 | - | - | - | - | - | - | - | - | - |
| 1b.4.13 | Railroad Track Maintenance | - | - | - | - | - | - | 31 | 5 | 36 | 36 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.14 | Security Staff Cost | - | - | - | - | - | - | 4,153 | 623 | 4,775 | 4,775 | - | - | - | - | - | - | - | - | - | 61,192 |
| 1b.4.15 | DOC Staff Cost | - | - | - | - | - | - | 5,846 | 877 | 6,723 | 6,723 | - | - | - | - | - | - | - | - | - | 63,266 |
| 1b.4.16 | Utility Staff Cost | - | - | - | - | - | - | 13,505 | 2,026 | 15,531 | 15,531 | - | - | - | - | - | - | - | - | - | 211,579 |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table C-1
Prairie Island DECON Unit 1
DECON Decommissioning Cost Estimate with DOE Pickup of Industry Spent Fuel Starting in 2035
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial/Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|--|---|--------------|--------------|-----------------|-----------------|---------------------------|---------------------|----------------|-------------------|----------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|----------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| 1b.4 | Subtotal Period 1b Period-Dependent Costs | 38 | 851 | 7 | 3 | - | 29 | 30,149 | 4,513 | 35,590 | 34,123 | 1,467 | - | - | 356 | - | - | - | 7,122 | 12 | 336,037 |
| 1b.0 | TOTAL PERIOD 1b COST | 3,795 | 4,613 | 440 | 475 | 178 | 5,354 | 41,023 | 9,641 | 65,519 | 62,317 | 2,278 | 924 | 6,132 | 13,351 | 588 | - | - | 597,873 | 45,493 | 377,612 |
| PERIOD 1 TOTALS | | 3,795 | 5,980 | 452 | 480 | 178 | 5,404 | 118,348 | 20,903 | 155,540 | 147,480 | 6,468 | 1,592 | 6,132 | 13,961 | 588 | - | - | 610,063 | 45,513 | 1,000,729 |
| PERIOD 2a - Large Component Removal | | | | | | | | | | | | | | | | | | | | | |
| Period 2a Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| Nuclear Steam Supply System Removal | | | | | | | | | | | | | | | | | | | | | |
| 2a.1.1.1 | Reactor Coolant Piping | 54 | 47 | 10 | 18 | - | 187 | - | 89 | 406 | 406 | - | - | - | 508 | - | - | - | 35,411 | 1,421 | - |
| 2a.1.1.2 | Pressurizer Relief Tank | 24 | 21 | 6 | 12 | - | 125 | - | 51 | 238 | 238 | - | - | - | 338 | - | - | - | 23,594 | 630 | - |
| 2a.1.1.3 | Reactor Coolant Pumps & Motors | 57 | 68 | 110 | 93 | - | 463 | - | 186 | 977 | 977 | - | - | - | 2,332 | - | - | - | 295,800 | 2,049 | 100 |
| 2a.1.1.4 | Pressurizer | - | 77 | 503 | 97 | - | 776 | - | 278 | 1,732 | 1,732 | - | - | - | 2,196 | - | - | - | 185,015 | 1,666 | 938 |
| 2a.1.1.5 | Steam Generators | - | 3,307 | 2,269 | 1,770 | 2,409 | 4,001 | - | 2,681 | 16,437 | 16,437 | - | - | 18,672 | 11,316 | - | - | - | 1,689,435 | 11,613 | 2,875 |
| 2a.1.1.6 | CRDMs/ICIs/Service Structure Removal | 302 | 281 | 218 | 66 | - | 938 | - | 488 | 2,294 | 2,294 | - | - | - | 4,797 | - | - | - | 177,400 | 8,104 | - |
| 2a.1.1.7 | Reactor Vessel Internals | 82 | 4,861 | 13,621 | 929 | - | 9,015 | 307 | 11,878 | 40,693 | 40,693 | - | - | - | 501 | 125 | 673 | - | 164,987 | 25,123 | 1,163 |
| 2a.1.1.8 | Reactor Vessel | 94 | 6,046 | 2,028 | 728 | - | 2,975 | 307 | 6,804 | 18,982 | 18,982 | - | - | - | 8,073 | - | - | - | 576,524 | 25,123 | 1,163 |
| 2a.1.1 | Totals | 613 | 14,709 | 18,764 | 3,714 | 2,409 | 18,480 | 614 | 22,455 | 81,759 | 81,759 | - | - | 18,672 | 30,062 | 125 | 673 | - | 3,148,166 | 75,729 | 6,240 |
| Removal of Major Equipment | | | | | | | | | | | | | | | | | | | | | |
| 2a.1.2 | Main Turbine/Generator | - | 331 | 172 | 64 | 527 | 377 | - | 283 | 1,752 | 1,752 | - | - | 2,131 | 1,187 | - | - | - | 203,265 | 4,667 | - |
| 2a.1.3 | Main Condensers | - | 2,801 | 109 | 62 | 705 | 533 | - | 960 | 5,170 | 5,170 | - | - | 3,800 | 1,587 | - | - | - | 271,824 | 39,151 | - |
| Cascading Costs from Clean Building Demolition | | | | | | | | | | | | | | | | | | | | | |
| 2a.1.4.1 | Reactor | - | 794 | - | - | - | - | - | 119 | 913 | 913 | - | - | - | - | - | - | - | - | 7,589 | - |
| 2a.1.4 | Totals | - | 794 | - | - | - | - | - | 119 | 913 | 913 | - | - | - | - | - | - | - | - | 7,589 | - |
| Disposal of Plant Systems | | | | | | | | | | | | | | | | | | | | | |
| 2a.1.5.1 | Air Removal | - | 31 | - | - | - | - | - | 5 | 36 | - | - | 36 | - | - | - | - | - | - | 452 | - |
| 2a.1.5.2 | Auxiliary Feedwater | - | 46 | - | - | - | - | - | 7 | 53 | - | - | 53 | - | - | - | - | - | - | 670 | - |
| 2a.1.5.3 | Auxiliary Feedwater - RCA | - | 47 | 0 | 2 | 36 | - | - | 17 | 102 | 102 | - | - | 215 | - | - | - | - | 8,722 | 601 | - |
| 2a.1.5.4 | Bleed Steam | - | 90 | - | - | - | - | - | 14 | 104 | - | - | 104 | - | - | - | - | - | - | 1,335 | - |
| 2a.1.5.5 | Caustic Addition - RCA | - | 38 | 0 | 2 | 39 | - | - | 16 | 95 | 95 | - | - | 233 | - | - | - | - | 9,453 | 444 | - |
| 2a.1.5.6 | Chemical Feed | - | 20 | - | - | - | - | - | 3 | 23 | - | - | 23 | - | - | - | - | - | - | 304 | - |
| 2a.1.5.7 | Chemical Feed - RCA | - | 1 | 0 | 0 | 1 | - | - | 0 | 3 | 3 | - | - | 6 | - | - | - | - | 243 | 12 | - |
| 2a.1.5.8 | Circulating Water | - | 42 | - | - | - | - | - | 6 | 49 | - | - | 49 | - | - | - | - | - | - | 619 | - |
| 2a.1.5.9 | Condensate | - | 474 | - | - | - | - | - | 71 | 545 | - | - | 545 | - | - | - | - | - | - | 6,837 | - |
| 2a.1.5.10 | Condensate Polishing | - | 235 | - | - | - | - | - | 35 | 271 | - | - | 271 | - | - | - | - | - | - | 3,420 | - |
| 2a.1.5.11 | Condensate Polishing - RCA | - | 183 | 4 | 15 | 348 | - | - | 101 | 651 | 651 | - | - | 2,078 | - | - | - | - | 84,395 | 2,329 | - |
| 2a.1.5.12 | Electro-hydraulic | - | 9 | - | - | - | - | - | 1 | 10 | - | - | 10 | - | - | - | - | - | - | 127 | - |
| 2a.1.5.13 | Feedwater | - | 153 | - | - | - | - | - | 23 | 175 | - | - | 175 | - | - | - | - | - | - | 2,215 | - |
| 2a.1.5.14 | Feedwater - RCA | - | 195 | 7 | 24 | 537 | - | - | 133 | 895 | 895 | - | - | 3,208 | - | - | - | - | 130,294 | 2,651 | - |
| 2a.1.5.15 | Gland Seal | - | 34 | - | - | - | - | - | 5 | 39 | - | - | 39 | - | - | - | - | - | - | 505 | - |
| 2a.1.5.16 | Heater Drain | - | 400 | - | - | - | - | - | 60 | 460 | - | - | 460 | - | - | - | - | - | - | 5,881 | - |
| 2a.1.5.17 | Internal Circ Water & CDSR | - | 27 | - | - | - | - | - | 4 | 31 | - | - | 31 | - | - | - | - | - | - | 389 | - |
| 2a.1.5.18 | Main Gen/Exciter/Transformer | - | 0 | - | - | - | - | - | 0 | 0 | - | - | 0 | - | - | - | - | - | - | 5 | - |
| 2a.1.5.19 | Main Steam | - | 115 | - | - | - | - | - | 17 | 133 | - | - | 133 | - | - | - | - | - | - | 1,690 | - |
| 2a.1.5.20 | Main Steam - RCA | - | 366 | 10 | 37 | 844 | - | - | 225 | 1,482 | 1,482 | - | - | 5,044 | - | - | - | - | 204,825 | 4,956 | - |
| 2a.1.5.21 | Steam Generator Blowdown | - | 478 | 22 | 29 | 340 | 234 | - | 235 | 1,337 | 1,337 | - | - | 2,031 | 686 | - | - | - | 126,640 | 6,667 | - |
| 2a.1.5.22 | Steam Generators | - | 5 | - | - | - | - | - | 1 | 6 | - | - | 6 | - | - | - | - | - | - | 75 | - |
| 2a.1.5.23 | Turbine & Moisture Separators | - | 386 | - | - | - | - | - | 58 | 444 | - | - | 444 | - | - | - | - | - | - | 5,609 | - |
| 2a.1.5.24 | Turbine Oil Purification | - | 70 | - | - | - | - | - | 11 | 81 | - | - | 81 | - | - | - | - | - | - | 1,003 | - |
| 2a.1.5 | Totals | - | 3,445 | 44 | 108 | 2,144 | 234 | - | 1,048 | 7,023 | 4,565 | - | 2,458 | 12,815 | 686 | - | - | - | 564,572 | 48,794 | - |
| 2a.1.6 | Scaffolding in support of decommissioning | - | 930 | 3 | 1 | 26 | 4 | - | 238 | 1,202 | 1,202 | - | - | 138 | 12 | - | - | - | 6,985 | 6,368 | - |
| 2a.1 | Subtotal Period 2a Activity Costs | 613 | 23,011 | 19,092 | 3,950 | 5,810 | 19,628 | 614 | 25,102 | 97,819 | 95,362 | - | 2,458 | 37,556 | 33,533 | 125 | 673 | - | 4,194,811 | 182,298 | 6,240 |
| Period 2a Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 2a.2.1 | Retired RPV Upper Internals Package | - | 257 | 387 | 217 | - | 1,394 | - | 1,041 | 3,296 | 3,296 | - | - | - | 376 | 112 | - | - | 50,164 | 3,333 | 133 |
| 2a.2 | Subtotal Period 2a Additional Costs | - | 257 | 387 | 217 | - | 1,394 | - | 1,041 | 3,296 | 3,296 | - | - | - | 376 | 112 | - | - | 50,164 | 3,333 | 133 |
| Period 2a Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 2a.3.1 | Process decommissioning water waste | 48 | - | 32 | 58 | - | 130 | - | 68 | 337 | 337 | - | - | - | 299 | - | - | - | 17,968 | 58 | - |
| 2a.3.3 | Small tool allowance | - | 239 | - | - | - | - | - | 36 | 274 | 247 | - | 27 | - | - | - | - | - | - | - | - |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table C-1
Prairie Island DECON Unit 1
DECON Decommissioning Cost Estimate with DOE Pickup of Industry Spent Fuel Starting in 2035
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|---------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| Period 2a Collateral Costs (continued) | | | | | | | | | | | | | | | | | | | | | | |
| 2a.3.4 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 1,639 | 246 | 1,885 | - | 1,885 | - | - | - | - | - | - | - | - | - | - |
| 2a.3.5 | Retention and Severance | - | - | - | - | - | - | 12,780 | 1,917 | 14,697 | 14,697 | - | - | - | - | - | - | - | - | - | - | - |
| 2a.3.6 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 1,780 | - | 1,780 | - | 1,780 | - | - | - | - | - | - | - | - | - | - |
| 2a.3 | Subtotal Period 2a Collateral Costs | 48 | 239 | 32 | 58 | - | 130 | 16,198 | 2,267 | 18,972 | 15,281 | 3,664 | 27 | - | 299 | - | - | - | - | 17,968 | 58 | - |
| Period 2a Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 2a.4.1 | Decon supplies | 107 | - | - | - | - | - | - | 27 | 134 | 134 | - | - | - | - | - | - | - | - | - | - | - |
| 2a.4.2 | Insurance | - | - | - | - | - | - | 690 | 69 | 759 | 759 | - | - | - | - | - | - | - | - | - | - | - |
| 2a.4.3 | Property taxes | - | - | - | - | - | - | 5,009 | 501 | 5,510 | 5,510 | - | - | - | - | - | - | - | - | - | - | - |
| 2a.4.4 | Health physics supplies | - | 1,950 | - | - | - | - | - | 487 | 2,437 | 2,437 | - | - | - | - | - | - | - | - | - | - | - |
| 2a.4.5 | Heavy equipment rental | - | 3,565 | - | - | - | - | - | 535 | 4,100 | 4,100 | - | - | - | - | - | - | - | - | - | - | - |
| 2a.4.6 | Disposal of DAW generated | - | - | 73 | 30 | - | 303 | - | 88 | 493 | 493 | - | - | - | 3,681 | - | - | - | - | 73,619 | 120 | - |
| 2a.4.7 | Plant energy budget | - | - | - | - | - | - | 2,194 | 329 | 2,523 | 2,523 | - | - | - | - | - | - | - | - | - | - | - |
| 2a.4.8 | NRC Fees | - | - | - | - | - | - | 842 | 84 | 926 | 926 | - | - | - | - | - | - | - | - | - | - | - |
| 2a.4.9 | Emergency Planning Fees | - | - | - | - | - | - | 2,647 | 265 | 2,912 | - | 2,912 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.10 | Fixed Overhead | - | - | - | - | - | - | 1,695 | 254 | 1,949 | 1,949 | - | - | - | - | - | - | - | - | - | - | - |
| 2a.4.11 | Spent Fuel Pool O&M | - | - | - | - | - | - | 602 | 90 | 692 | - | 692 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.12 | ISFSI Operating Costs | - | - | - | - | - | - | 80 | 12 | 92 | - | 92 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.13 | Railroad Track Maintenance | - | - | - | - | - | - | 318 | 48 | 366 | 366 | - | - | - | - | - | - | - | - | - | - | - |
| 2a.4.14 | Remedial Actions Surveys | - | - | - | - | - | - | 1,596 | 239 | 1,835 | 1,835 | - | - | - | - | - | - | - | - | - | - | - |
| 2a.4.15 | Security Staff Cost | - | - | - | - | - | - | 11,727 | 1,759 | 13,486 | 13,486 | - | - | - | - | - | - | - | - | - | - | 172,726 |
| 2a.4.16 | DOC Staff Cost | - | - | - | - | - | - | 20,663 | 3,099 | 23,763 | 23,763 | - | - | - | - | - | - | - | - | - | - | 225,210 |
| 2a.4.17 | Utility Staff Cost | - | - | - | - | - | - | 26,905 | 4,036 | 30,941 | 30,941 | - | - | - | - | - | - | - | - | - | - | 417,453 |
| 2a.4 | Subtotal Period 2a Period-Dependent Costs | 107 | 5,515 | 73 | 30 | - | 303 | 74,968 | 11,922 | 92,918 | 89,223 | 3,696 | - | - | 3,681 | - | - | - | - | 73,619 | 120 | 815,389 |
| 2a.0 | TOTAL PERIOD 2a COST | 768 | 29,021 | 19,584 | 4,254 | 5,810 | 21,456 | 91,780 | 40,333 | 213,006 | 203,161 | 7,360 | 2,485 | 37,556 | 37,889 | 237 | 673 | - | - | 4,336,562 | 185,810 | 821,762 |
| PERIOD 2b - Site Decontamination | | | | | | | | | | | | | | | | | | | | | | |
| Period 2b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Disposal of Plant Systems | | | | | | | | | | | | | | | | | | | | | | |
| 2b.1.1.1 | Aux Bldg Normal Ventilation | - | 2 | 0 | 0 | 1 | - | - | 1 | 3 | 3 | - | - | 3 | - | - | - | - | - | 140 | 29 | - |
| 2b.1.1.2 | Battery Rm Special Ventilation | - | 0 | - | - | - | - | - | 0 | 0 | - | - | 0 | - | - | - | - | - | - | - | - | 6 |
| 2b.1.1.3 | Buildings Maintenance | - | 5 | - | - | - | - | - | 1 | 5 | - | - | 5 | - | - | - | - | - | - | - | - | 65 |
| 2b.1.1.4 | Chemical & Volume Control | 1,120 | 1,389 | 89 | 90 | 753 | 973 | - | 1,286 | 5,700 | 5,700 | - | - | 4,498 | 2,846 | - | - | - | - | 366,565 | 34,533 | - |
| 2b.1.1.5 | Component Cooling - RCA | - | 858 | 25 | 91 | 2,079 | - | - | 543 | 3,597 | 3,597 | - | - | 12,427 | - | - | - | - | - | 504,675 | 11,242 | - |
| 2b.1.1.6 | Containment Cooling | - | 74 | - | - | - | - | - | 11 | 85 | - | - | 85 | - | - | - | - | - | - | - | - | 1,086 |
| 2b.1.1.7 | Containment Cooling - RCA | - | 304 | 7 | 25 | 569 | - | - | 166 | 1,070 | 1,070 | - | - | 3,400 | - | - | - | - | - | 138,090 | 3,971 | - |
| 2b.1.1.8 | Containment Hydrogen Control - RCA | - | 30 | 0 | 1 | 18 | - | - | 10 | 59 | 59 | - | - | 105 | - | - | - | - | - | 4,278 | 401 | - |
| 2b.1.1.9 | Containment Spray - RCA | - | 93 | 2 | 6 | 145 | - | - | 46 | 293 | 293 | - | - | 868 | - | - | - | - | - | 35,249 | 1,217 | - |
| 2b.1.1.10 | Containment Ventilation | - | 255 | 24 | 51 | 828 | 248 | - | 260 | 1,667 | 1,667 | - | - | 4,951 | 737 | - | - | - | - | 247,952 | 3,668 | - |
| 2b.1.1.11 | Cooling Water | - | 163 | - | - | - | - | - | 24 | 187 | - | - | 187 | - | - | - | - | - | - | - | - | 2,396 |
| 2b.1.1.12 | Cooling Water - RCA | - | 658 | 16 | 57 | 1,293 | - | - | 368 | 2,392 | 2,392 | - | - | 7,728 | - | - | - | - | - | 313,832 | 8,594 | - |
| 2b.1.1.13 | D1 Emergency Diesel | - | 50 | - | - | - | - | - | 8 | 58 | - | - | 58 | - | - | - | - | - | - | - | - | 730 |
| 2b.1.1.14 | D2 Emergency Diesel | - | 36 | - | - | - | - | - | 5 | 41 | - | - | 41 | - | - | - | - | - | - | - | - | 522 |
| 2b.1.1.15 | Diesel Rooms Ventilation | - | 9 | - | - | - | - | - | 1 | 11 | - | - | 11 | - | - | - | - | - | - | - | - | 135 |
| 2b.1.1.16 | Electrical - Clean | - | 1,905 | - | - | - | - | - | 286 | 2,191 | - | - | 2,191 | - | - | - | - | - | - | - | - | 26,981 |
| 2b.1.1.17 | Electrical - Contaminated | - | 611 | 7 | 20 | 423 | 32 | - | 228 | 1,321 | 1,321 | - | - | 2,527 | 95 | - | - | - | - | 108,690 | 8,377 | - |
| 2b.1.1.18 | Electrical - Decontaminated | - | 3,787 | 48 | 173 | 3,940 | - | - | 1,569 | 9,518 | 9,518 | - | - | 23,551 | - | - | - | - | - | 956,401 | 49,378 | - |
| 2b.1.1.19 | Fuel Handling | - | 121 | 6 | 11 | 152 | 73 | - | 74 | 436 | 436 | - | - | 908 | 218 | - | - | - | - | 50,723 | 1,784 | - |
| 2b.1.1.20 | Fuel Oil | - | 121 | - | - | - | - | - | 18 | 140 | - | - | 140 | - | - | - | - | - | - | - | - | 1,697 |
| 2b.1.1.21 | HVAC - Clean | - | 120 | - | - | - | - | - | 18 | 138 | - | - | 138 | - | - | - | - | - | - | - | - | 1,891 |
| 2b.1.1.22 | HVAC - Contaminated | - | 374 | 9 | 26 | 546 | 41 | - | 190 | 1,186 | 1,186 | - | - | 3,261 | 123 | - | - | - | - | 140,257 | 5,032 | - |
| 2b.1.1.23 | Incore Instrumentation | 0 | 28 | 1 | 2 | 10 | 19 | - | 14 | 74 | 74 | - | - | 60 | 57 | - | - | - | - | 6,058 | 425 | - |
| 2b.1.1.24 | Misc Drains & Vents | - | 233 | 15 | 13 | 65 | 176 | - | 115 | 618 | 618 | - | - | 390 | 514 | - | - | - | - | 49,062 | 3,091 | - |
| 2b.1.1.25 | Reactor Coolant | 153 | 311 | 21 | 18 | 58 | 265 | - | 234 | 1,060 | 1,060 | - | - | 344 | 777 | - | - | - | - | 64,085 | 6,470 | - |
| 2b.1.1.26 | Reactor Hot Sampling | 149 | 136 | 12 | 7 | 11 | 118 | - | 142 | 576 | 576 | - | - | 66 | 342 | - | - | - | - | 25,063 | 3,946 | - |
| 2b.1.1.27 | Reactor Makeup | - | 73 | - | - | - | - | - | 11 | 84 | - | - | 84 | - | - | - | - | - | - | - | - | 1,042 |
| 2b.1.1.28 | Reactor Vessel | 9 | 21 | 1 | 0 | 4 | 5 | - | 12 | 52 | 52 | - | - | 26 | 14 | - | - | - | - | 2,000 | 425 | - |
| 2b.1.1.29 | Residual Heat Removal | 357 | 419 | 85 | 86 | 484 | 1,105 | - | 654 | 3,190 | 3,190 | - | - | 2,895 | 3,252 | - | - | - | - | 326,425 | 7,621 | - |
| 2b.1.1.30 | Safeguards Chilled Water | - | 18 | - | - | - | - | - | 3 | 20 | - | - | 20 | - | - | - | - | - | - | - | - | 259 |
| 2b.1.1.31 | Safety Injection | - | 893 | 42 | 73 | 1,136 | 393 | - | 507 | 3,044 | 3,044 | - | - | 6,788 | 1,156 | - | - | - | - | 349,908 | 12,561 | - |
| 2b.1.1.32 | Sampling | - | 60 | 4 | 3 | 10 | 37 | - | 26 | 140 | 140 | - | - | 59 | 107 | - | - | - | - | 9,420 | 811 | - |
| 2b.1.1.33 | Shield Bldg Ventilation | - | 140 | 14 | 26 | 360 | 165 | - | 135 | 839 | 839 | - | - | 2,152 | 491 | - | - | - | - | 118,583 | 2,030 | - |
| 2b.1.1.34 | Station & Instrument Air | - | 20 | - | - | - | - | - | 3 | 23 | - | - | 23 | - | - | - | - | - | - | - | - | 300 |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table C-1
Prairie Island DECON Unit 1
DECON Decommissioning Cost Estimate with DOE Pickup of Industry Spent Fuel Starting in 2035
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial/Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|--|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|----------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| Disposal of Plant Systems (continued) | | | | | | | | | | | | | | | | | | | | | |
| 2b.1.1.35 | Station & Instrument Air - RCA | - | 81 | 1 | 2 | 56 | - | - | 29 | 169 | 169 | - | - | 332 | - | - | - | - | 13,496 | 1,053 | - |
| 2b.1.1.36 | Turbine Bldg Traps & Drains | - | 50 | - | - | - | - | - | 8 | 58 | - | - | 58 | - | - | - | - | - | - | 767 | - |
| 2b.1.1.37 | Unit Coolers | - | 42 | - | - | - | - | - | 6 | 49 | - | - | 49 | - | - | - | - | - | - | 611 | - |
| 2b.1.1.38 | Unit Coolers - RCA | - | 55 | 0 | 2 | 39 | - | - | 20 | 115 | 115 | - | - | 230 | - | - | - | - | 9,348 | 683 | - |
| 2b.1.1 | Totals | 1,789 | 13,544 | 429 | 786 | 12,979 | 3,651 | - | 7,032 | 40,209 | 37,119 | - | 3,091 | 77,571 | 10,728 | - | - | - | 3,840,299 | 205,829 | - |
| 2b.1.2 | Scaffolding in support of decommissioning | - | 1,163 | 4 | 2 | 32 | 5 | - | 297 | 1,503 | 1,503 | - | - | 173 | 15 | - | - | - | 8,731 | 7,960 | - |
| Decontamination of Site Buildings | | | | | | | | | | | | | | | | | | | | | |
| 2b.1.3.1 | Reactor | 1,215 | 2,807 | 240 | 1,236 | 373 | 13,624 | - | 4,981 | 24,476 | 24,476 | - | - | 2,230 | 83,429 | - | - | - | 3,633,417 | 50,950 | - |
| 2b.1.3.2 | Backwash Waste Receiving Tank | - | 28 | 3 | 17 | - | 97 | - | 34 | 179 | 179 | - | - | - | 929 | - | - | - | 43,896 | 301 | - |
| 2b.1.3 | Totals | 1,215 | 2,835 | 243 | 1,253 | 373 | 13,721 | - | 5,015 | 24,655 | 24,655 | - | - | 2,230 | 84,358 | - | - | - | 3,677,313 | 51,251 | - |
| 2b.1.4 | Prepare/submit License Termination Plan | - | - | - | - | - | - | 526 | 79 | 605 | 605 | - | - | - | - | - | - | - | - | - | 4,096 |
| 2b.1.5 | Receive NRC approval of termination plan | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 2b.1 | Subtotal Period 2b Activity Costs | 3,004 | 17,542 | 675 | 2,041 | 13,384 | 17,377 | 526 | 12,423 | 66,973 | 63,882 | - | 3,091 | 79,974 | 95,101 | - | - | - | 7,526,343 | 265,040 | 4,096 |
| Period 2b Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 2b.2.1 | Operational Equipment | - | - | 11 | 36 | 606 | - | - | 97 | 751 | 751 | - | - | 5,880 | - | - | - | - | 147,000 | 16 | - |
| 2b.2.2 | Excavation of Underground Services | - | 1,175 | - | - | - | - | 225 | 328 | 1,728 | 1,728 | - | - | - | - | - | - | - | - | 7,411 | - |
| 2b.2.3 | Security Modifications | - | - | - | - | - | - | 4,348 | 652 | 5,000 | 5,000 | - | - | - | - | - | - | - | - | - | - |
| 2b.2 | Subtotal Period 2b Additional Costs | - | 1,175 | 11 | 36 | 606 | - | 4,573 | 1,077 | 7,478 | 7,478 | - | - | 5,880 | - | - | - | - | 147,000 | 7,427 | - |
| Period 2b Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 2b.3.1 | Process decommissioning water waste | 108 | - | 74 | 132 | - | 298 | - | 156 | 768 | 768 | - | - | - | 684 | - | - | - | 41,053 | 133 | - |
| 2b.3.2 | Process decommissioning chemical flush waste | 2 | - | 90 | 296 | - | 677 | - | 224 | 1,289 | 1,289 | - | - | - | 875 | - | - | - | 93,252 | 164 | - |
| 2b.3.3 | Small tool allowance | - | 315 | - | - | - | - | - | 47 | 362 | 362 | - | - | - | - | - | - | - | - | - | - |
| 2b.3.4 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 7,142 | 1,071 | 8,213 | - | 8,213 | - | - | - | - | - | - | - | - | - |
| 2b.3.5 | Retention and Severance | - | - | - | - | - | - | 6,141 | 921 | 7,063 | 7,063 | - | - | - | - | - | - | - | - | - | - |
| 2b.3.6 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 1,348 | - | 1,348 | - | 1,348 | - | - | - | - | - | - | - | - | - |
| 2b.3 | Subtotal Period 2b Collateral Costs | 110 | 315 | 164 | 428 | - | 975 | 14,631 | 2,419 | 19,043 | 9,482 | 9,561 | - | - | 1,559 | - | - | - | 134,305 | 297 | - |
| Period 2b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 2b.4.1 | Decon supplies | 511 | - | - | - | - | - | - | 128 | 639 | 639 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.2 | Insurance | - | - | - | - | - | - | 523 | 52 | 575 | 575 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.3 | Property taxes | - | - | - | - | - | - | 3,435 | 344 | 3,779 | 3,779 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.4 | Health physics supplies | - | 2,140 | - | - | - | - | - | 535 | 2,675 | 2,675 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.5 | Heavy equipment rental | - | 2,774 | - | - | - | - | - | 416 | 3,190 | 3,190 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.6 | Disposal of DAW generated | - | - | 70 | 28 | - | 290 | - | 84 | 472 | 472 | - | - | - | 3,521 | - | - | - | 70,425 | 115 | - |
| 2b.4.7 | Plant energy budget | - | - | - | - | - | - | 1,313 | 197 | 1,509 | 1,509 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.8 | NRC Fees | - | - | - | - | - | - | 638 | 64 | 701 | 701 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.9 | Emergency Planning Fees | - | - | - | - | - | - | 2,006 | 201 | 2,207 | - | 2,207 | - | - | - | - | - | - | - | - | - |
| 2b.4.10 | Fixed Overhead | - | - | - | - | - | - | 1,284 | 193 | 1,477 | 1,477 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.11 | Spent Fuel Pool O&M | - | - | - | - | - | - | 456 | 68 | 524 | - | 524 | - | - | - | - | - | - | - | - | - |
| 2b.4.12 | Liquid Radwaste Processing Equipment/Services | - | - | - | - | - | - | 229 | 34 | 264 | 264 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.13 | ISFSI Operating Costs | - | - | - | - | - | - | 60 | 9 | 69 | - | 69 | - | - | - | - | - | - | - | - | - |
| 2b.4.14 | Railroad Track Maintenance | - | - | - | - | - | - | 67 | 10 | 78 | 78 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.15 | Remedial Actions Surveys | - | - | - | - | - | - | 1,209 | 181 | 1,391 | 1,391 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.16 | Security Staff Cost | - | - | - | - | - | - | 8,259 | 1,239 | 9,497 | 9,497 | - | - | - | - | - | - | - | - | - | 121,244 |
| 2b.4.17 | DOC Staff Cost | - | - | - | - | - | - | 10,738 | 1,611 | 12,348 | 12,348 | - | - | - | - | - | - | - | - | - | 121,244 |
| 2b.4.18 | Utility Staff Cost | - | - | - | - | - | - | 13,928 | 2,089 | 16,017 | 16,017 | - | - | - | - | - | - | - | - | - | 225,649 |
| 2b.4 | Subtotal Period 2b Period-Dependent Costs | 511 | 4,914 | 70 | 28 | - | 290 | 44,145 | 7,454 | 57,412 | 54,612 | 2,800 | - | - | 3,521 | - | - | - | 70,425 | 115 | 468,137 |
| 2b.0 | TOTAL PERIOD 2b COST | 3,626 | 23,946 | 920 | 2,533 | 13,990 | 18,642 | 63,876 | 23,374 | 150,907 | 135,455 | 12,362 | 3,091 | 85,854 | 100,182 | - | - | - | 7,878,073 | 272,879 | 472,233 |
| PERIOD 2c - Spent fuel delay prior to SFP decon | | | | | | | | | | | | | | | | | | | | | |
| Period 2c Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| Period 2c Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 2c.3.1 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 51,417 | 7,713 | 59,130 | - | 59,130 | - | - | - | - | - | - | - | - | - |
| 2c.3.2 | Retention and Severance | - | - | - | - | - | - | 3,512 | 527 | 4,039 | 4,039 | - | - | - | - | - | - | - | - | - | - |
| 2c.3.3 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 1,526 | - | 1,526 | - | 1,526 | - | - | - | - | - | - | - | - | - |
| 2c.3 | Subtotal Period 2c Collateral Costs | - | - | - | - | - | - | 56,456 | 8,239 | 64,695 | 4,039 | 60,656 | - | - | - | - | - | - | - | - | - |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table C-1
Prairie Island DECON Unit 1
DECON Decommissioning Cost Estimate with DOE Pickup of Industry Spent Fuel Starting in 2035
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial/Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|----------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| Period 2c Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 2c.4.1 | Insurance | - | - | - | - | - | - | 592 | 59 | 651 | 651 | - | - | - | - | - | - | - | - | - | - |
| 2c.4.2 | Property taxes | - | - | - | - | - | - | 3,512 | 351 | 3,863 | 3,863 | - | - | - | - | - | - | - | - | - | - |
| 2c.4.3 | Health physics supplies | - | 263 | - | - | - | - | - | 66 | 328 | 328 | - | - | - | - | - | - | - | - | - | - |
| 2c.4.4 | Disposal of DAW generated | - | - | 9 | 4 | - | 38 | - | 11 | 61 | 61 | - | - | - | 457 | - | - | - | 9,141 | 15 | - |
| 2c.4.5 | Plant energy budget | - | - | - | - | - | - | 1,486 | 223 | 1,709 | 1,709 | - | - | - | - | - | - | - | - | - | - |
| 2c.4.6 | NRC Fees | - | - | - | - | - | - | 687 | 69 | 756 | 756 | - | - | - | - | - | - | - | - | - | - |
| 2c.4.7 | Emergency Planning Fees | - | - | - | - | - | - | 2,271 | 227 | 2,498 | - | 2,498 | - | - | - | - | - | - | - | - | - |
| 2c.4.8 | Fixed Overhead | - | - | - | - | - | - | 1,454 | 218 | 1,672 | 1,672 | - | - | - | - | - | - | - | - | - | - |
| 2c.4.9 | Spent Fuel Pool O&M | - | - | - | - | - | - | 516 | 77 | 593 | - | 593 | - | - | - | - | - | - | - | - | - |
| 2c.4.10 | Liquid Radwaste Processing Equipment/Services | - | - | - | - | - | - | 260 | 39 | 298 | 298 | - | - | - | - | - | - | - | - | - | - |
| 2c.4.11 | ISFSI Operating Costs | - | - | - | - | - | - | 68 | 10 | 79 | - | 79 | - | - | - | - | - | - | - | - | - |
| 2c.4.12 | Railroad Track Maintenance | - | - | - | - | - | - | 76 | 11 | 88 | 88 | - | - | - | - | - | - | - | - | - | - |
| 2c.4.13 | Security Staff Cost | - | - | - | - | - | - | 9,348 | 1,402 | 10,751 | 10,751 | - | - | - | - | - | - | - | - | - | 137,246 |
| 2c.4.14 | Utility Staff Cost | - | - | - | - | - | - | 1,195 | 179 | 1,375 | 1,375 | - | - | - | - | - | - | - | - | - | 19,062 |
| 2c.4 | Subtotal Period 2c Period-Dependent Costs | - | 263 | 9 | 4 | - | 38 | 21,465 | 2,943 | 24,721 | 21,552 | 3,170 | - | - | 457 | - | - | - | 9,141 | 15 | 156,308 |
| 2c.0 | TOTAL PERIOD 2c COST | - | 263 | 9 | 4 | - | 38 | 77,921 | 11,183 | 89,417 | 25,591 | 63,826 | - | - | 457 | - | - | - | 9,141 | 15 | 156,308 |
| PERIOD 2d - Decontamination Following Wet Fuel Storage | | | | | | | | | | | | | | | | | | | | | |
| Period 2d Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| 2d.1.1 | Remove spent fuel racks | 347 | 35 | 86 | 41 | - | 703 | - | 373 | 1,585 | 1,585 | - | - | - | 2,092 | - | - | - | 132,919 | 576 | - |
| Disposal of Plant Systems | | | | | | | | | | | | | | | | | | | | | |
| 2d.1.2.1 | Electrical - Contaminated - Fuel Pool | - | 152 | 2 | 5 | 103 | 8 | - | 56 | 325 | 325 | - | - | 615 | 23 | - | - | - | 26,449 | 2,077 | - |
| 2d.1.2.2 | Electrical - Decontaminated - Fuel Pool | - | 947 | 12 | 43 | 986 | - | - | 392 | 2,380 | 2,380 | - | - | 5,893 | - | - | - | - | 239,327 | 12,340 | - |
| 2d.1.2.3 | HVAC - Contaminated - Fuel Pool | - | 160 | 4 | 11 | 234 | 18 | - | 82 | 508 | 508 | - | - | 1,398 | 53 | - | - | - | 60,110 | 2,157 | - |
| 2d.1.2.4 | Safeguards Chilled Water - RCA | - | 85 | 1 | 4 | 83 | - | - | 34 | 207 | 207 | - | - | 495 | - | - | - | - | 20,100 | 1,019 | - |
| 2d.1.2.5 | Spent Fuel Pool Cooling | 303 | 357 | 34 | 32 | 135 | 450 | - | 382 | 1,693 | 1,693 | - | - | 806 | 1,325 | - | - | - | 117,816 | 7,613 | - |
| 2d.1.2.6 | Station & Instrument Air - RCA Fuel Pool | - | 20 | 0 | 1 | 14 | - | - | 7 | 42 | 42 | - | - | 83 | - | - | - | - | 3,374 | 263 | - |
| 2d.1.2 | Totals | 303 | 1,721 | 52 | 96 | 1,554 | 476 | - | 954 | 5,157 | 5,157 | - | - | 9,290 | 1,401 | - | - | - | 467,176 | 25,468 | - |
| Decontamination of Site Buildings | | | | | | | | | | | | | | | | | | | | | |
| 2d.1.4 | Scaffolding in support of decommissioning | - | 233 | 1 | 0 | 6 | 1 | - | 59 | 301 | 301 | - | - | 35 | 3 | - | - | - | 1,746 | 1,592 | - |
| 2d.1 | Subtotal Period 2d Activity Costs | 650 | 1,989 | 139 | 138 | 1,561 | 1,180 | - | 1,386 | 7,042 | 7,042 | - | - | 9,325 | 3,496 | - | - | - | 601,841 | 27,637 | - |
| Period 2d Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 2d.2.1 | License Termination Survey Planning | - | - | - | - | - | - | 1,037 | 311 | 1,348 | 1,348 | - | - | - | - | - | - | - | - | - | 6,240 |
| 2d.2 | Subtotal Period 2d Additional Costs | - | - | - | - | - | - | 1,037 | 311 | 1,348 | 1,348 | - | - | - | - | - | - | - | - | - | 6,240 |
| Period 2d Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 2d.3.1 | Process decommissioning water waste | 30 | - | 21 | 38 | - | 86 | - | 44 | 220 | 220 | - | - | - | 197 | - | - | - | 11,793 | 38 | - |
| 2d.3.2 | Process decommissioning chemical flush waste | 1 | - | 34 | 110 | - | 251 | - | 83 | 478 | 478 | - | - | - | 324 | - | - | - | 34,576 | 61 | - |
| 2d.3.3 | Small tool allowance | - | 37 | - | - | - | - | - | 6 | 42 | 42 | - | - | - | - | - | - | - | - | - | - |
| 2d.3.4 | Decommissioning Equipment Disposition | - | - | 130 | 67 | 1,112 | 178 | - | 234 | 1,722 | 1,722 | - | - | 6,000 | 529 | - | - | - | 303,608 | 147 | - |
| 2d.3.5 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 1,159 | 174 | 1,333 | - | 1,333 | - | - | - | - | - | - | - | - | - |
| 2d.3.6 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 975 | - | 975 | - | 975 | - | - | - | - | - | - | - | - | - |
| 2d.3 | Subtotal Period 2d Collateral Costs | 31 | 37 | 185 | 215 | 1,112 | 514 | 2,135 | 541 | 4,770 | 2,462 | 2,308 | - | 6,000 | 1,050 | - | - | - | 349,977 | 246 | - |
| Period 2d Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 2d.4.1 | Decon supplies | 59 | - | - | - | - | - | - | 15 | 73 | 73 | - | - | - | - | - | - | - | - | - | - |
| 2d.4.2 | Insurance | - | - | - | - | - | - | 378 | 38 | 416 | 416 | - | - | - | - | - | - | - | - | - | - |
| 2d.4.3 | Property taxes | - | - | - | - | - | - | 2,004 | 200 | 2,204 | 2,204 | - | - | - | - | - | - | - | - | - | - |
| 2d.4.4 | Health physics supplies | - | 575 | - | - | - | - | - | 144 | 719 | 719 | - | - | - | - | - | - | - | - | - | - |
| 2d.4.5 | Heavy equipment rental | - | 2,007 | - | - | - | - | - | 301 | 2,308 | 2,308 | - | - | - | - | - | - | - | - | - | - |
| 2d.4.6 | Disposal of DAW generated | - | - | 16 | 7 | - | 68 | - | 20 | 111 | 111 | - | - | - | 830 | - | - | - | 16,609 | 27 | - |
| 2d.4.7 | Plant energy budget | - | - | - | - | - | - | 506 | 76 | 582 | 582 | - | - | - | - | - | - | - | - | - | - |
| 2d.4.8 | NRC Fees | - | - | - | - | - | - | 439 | 44 | 483 | 483 | - | - | - | - | - | - | - | - | - | - |
| 2d.4.9 | Emergency Planning Fees | - | - | - | - | - | - | 58 | 6 | 64 | - | 64 | - | - | - | - | - | - | - | - | - |
| 2d.4.10 | Fixed Overhead | - | - | - | - | - | - | 929 | 139 | 1,068 | 1,068 | - | - | - | - | - | - | - | - | - | - |
| 2d.4.11 | Liquid Radwaste Processing Equipment/Services | - | - | - | - | - | - | 332 | 50 | 381 | 381 | - | - | - | - | - | - | - | - | - | - |
| 2d.4.12 | ISFSI Operating Costs | - | - | - | - | - | - | 44 | 7 | 50 | - | 50 | - | - | - | - | - | - | - | - | - |
| 2d.4.13 | Railroad Track Maintenance | - | - | - | - | - | - | 49 | 7 | 56 | 56 | - | - | - | - | - | - | - | - | - | - |
| 2d.4.14 | Remedial Actions Surveys | - | - | - | - | - | - | 875 | 131 | 1,006 | 1,006 | - | - | - | - | - | - | - | - | - | - |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table C-1
Prairie Island DECON Unit 1
DECON Decommissioning Cost Estimate with DOE Pickup of Industry Spent Fuel Starting in 2035
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial/Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|--|---|--------------|---------------|-----------------|-----------------|---------------------------|---------------------|----------------|-------------------|----------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|----------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| Period 2d Period-Dependent Costs (continued) | | | | | | | | | | | | | | | | | | | | | |
| 2d.4.15 | Security Staff Cost | - | - | - | - | - | - | 5,782 | 867 | 6,649 | 4,694 | 1,955 | - | - | - | - | - | - | - | - | 84,454 |
| 2d.4.16 | DOC Staff Cost | - | - | - | - | - | - | 6,401 | 960 | 7,361 | 7,361 | - | - | - | - | - | - | - | - | - | 70,243 |
| 2d.4.17 | Utility Staff Cost | - | - | - | - | - | - | 8,100 | 1,215 | 9,315 | 8,858 | 456 | - | - | - | - | - | - | - | - | 126,681 |
| 2d.4 | Subtotal Period 2d Period-Dependent Costs | 59 | 2,582 | 16 | 7 | - | 68 | 25,896 | 4,220 | 32,848 | 30,323 | 2,525 | - | - | 830 | - | - | - | 16,609 | 27 | 281,377 |
| 2d.0 | TOTAL PERIOD 2d COST | 740 | 4,608 | 340 | 360 | 2,673 | 1,763 | 29,067 | 6,458 | 46,008 | 41,175 | 4,834 | - | 15,325 | 5,377 | - | - | - | 968,427 | 27,910 | 287,617 |
| PERIOD 2f - License Termination | | | | | | | | | | | | | | | | | | | | | |
| Period 2f Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| 2f.1.1 | ORISE confirmatory survey | - | - | - | - | - | - | 166 | 50 | 216 | 216 | - | - | - | - | - | - | - | - | - | - |
| 2f.1.2 | Terminate license | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 2f.1 | Subtotal Period 2f Activity Costs | - | - | - | - | - | - | 166 | 50 | 216 | 216 | - | - | - | - | - | - | - | - | - | - |
| Period 2f Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 2f.2.1 | License Termination Survey | - | - | - | - | - | - | 3,199 | 960 | 4,159 | 4,159 | - | - | - | - | - | - | - | - | 40,531 | 3,120 |
| 2f.2 | Subtotal Period 2f Additional Costs | - | - | - | - | - | - | 3,199 | 960 | 4,159 | 4,159 | - | - | - | - | - | - | - | - | 40,531 | 3,120 |
| Period 2f Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 2f.3.1 | DOC staff relocation expenses | - | - | - | - | - | - | 1,264 | 190 | 1,454 | 1,454 | - | - | - | - | - | - | - | - | - | - |
| 2f.3.2 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 603 | 90 | 693 | - | 693 | - | - | - | - | - | - | - | - | - |
| 2f.3.3 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 934 | - | 934 | - | 934 | - | - | - | - | - | - | - | - | - |
| 2f.3 | Subtotal Period 2f Collateral Costs | - | - | - | - | - | - | 2,801 | 280 | 3,081 | 1,454 | 1,628 | - | - | - | - | - | - | - | - | - |
| Period 2f Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 2f.4.1 | Insurance | - | - | - | - | - | - | 362 | 36 | 398 | 398 | - | - | - | - | - | - | - | - | - | - |
| 2f.4.2 | Property taxes | - | - | - | - | - | - | 1,771 | 177 | 1,948 | 1,948 | - | - | - | - | - | - | - | - | - | - |
| 2f.4.3 | Health physics supplies | - | 501 | - | - | - | - | - | 125 | 626 | 626 | - | - | - | - | - | - | - | - | - | - |
| 2f.4.4 | Disposal of DAW generated | - | - | 7 | 3 | - | 28 | - | 8 | 45 | 45 | - | - | 334 | - | - | - | - | 6,685 | 11 | - |
| 2f.4.5 | Plant energy budget | - | - | - | - | - | - | 243 | 36 | 279 | 279 | - | - | - | - | - | - | - | - | - | - |
| 2f.4.6 | NRC Fees | - | - | - | - | - | - | 422 | 42 | 465 | 465 | - | - | - | - | - | - | - | - | - | - |
| 2f.4.7 | Emergency Planning Fees | - | - | - | - | - | - | 55 | 6 | 61 | - | 61 | - | - | - | - | - | - | - | - | - |
| 2f.4.8 | Fixed Overhead | - | - | - | - | - | - | 890 | 133 | 1,023 | 1,023 | - | - | - | - | - | - | - | - | - | - |
| 2f.4.9 | ISFSI Operating Costs | - | - | - | - | - | - | 42 | 6 | 48 | - | 48 | - | - | - | - | - | - | - | - | - |
| 2f.4.10 | Railroad Track Maintenance | - | - | - | - | - | - | 47 | 7 | 54 | 54 | - | - | - | - | - | - | - | - | - | - |
| 2f.4.11 | Security Staff Cost | - | - | - | - | - | - | 5,538 | 831 | 6,369 | 4,497 | 1,873 | - | - | - | - | - | - | - | - | 80,898 |
| 2f.4.12 | DOC Staff Cost | - | - | - | - | - | - | 4,238 | 636 | 4,874 | 4,874 | - | - | - | - | - | - | - | - | - | 46,283 |
| 2f.4.13 | Utility Staff Cost | - | - | - | - | - | - | 4,011 | 602 | 4,613 | 4,175 | 438 | - | - | - | - | - | - | - | - | 59,507 |
| 2f.4 | Subtotal Period 2f Period-Dependent Costs | - | 501 | 7 | 3 | - | 28 | 17,620 | 2,646 | 20,803 | 18,384 | 2,420 | - | - | 334 | - | - | - | 6,685 | 11 | 186,687 |
| 2f.0 | TOTAL PERIOD 2f COST | - | 501 | 7 | 3 | - | 28 | 23,786 | 3,935 | 28,259 | 24,212 | 4,048 | - | - | 334 | - | - | - | 6,685 | 40,542 | 189,807 |
| PERIOD 2 TOTALS | | 5,134 | 58,338 | 20,860 | 7,153 | 22,473 | 41,926 | 286,430 | 85,282 | 527,597 | 429,593 | 92,428 | 5,576 | 138,734 | 144,239 | 237 | 673 | - | 13,198,890 | 527,156 | 1,927,726 |
| PERIOD 3b - Site Restoration | | | | | | | | | | | | | | | | | | | | | |
| Period 3b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| Demolition of Remaining Site Buildings | | | | | | | | | | | | | | | | | | | | | |
| 3b.1.1.1 | Reactor | - | 4,644 | - | - | - | - | - | 697 | 5,341 | - | - | 5,341 | - | - | - | - | - | - | 44,669 | - |
| 3b.1.1.2 | Condensate Storage Tank Foundation | - | 3 | - | - | - | - | - | 0 | 4 | - | - | 4 | - | - | - | - | - | - | 16 | - |
| 3b.1.1.3 | Structures below 3' below grade | - | 1,651 | - | - | - | - | - | 248 | 1,899 | - | - | 1,899 | - | - | - | - | - | - | 8,411 | - |
| 3b.1.1.4 | Turbine | - | 2,139 | - | - | - | - | - | 321 | 2,460 | - | - | 2,460 | - | - | - | - | - | - | 21,985 | - |
| 3b.1.1.5 | Turbine Pedestal | - | 365 | - | - | - | - | - | 55 | 420 | - | - | 420 | - | - | - | - | - | - | 1,857 | - |
| 3b.1.1 | Totals | - | 8,803 | - | - | - | - | - | 1,320 | 10,123 | - | - | 10,123 | - | - | - | - | - | - | 76,939 | - |
| Site Closeout Activities | | | | | | | | | | | | | | | | | | | | | |
| 3b.1.2 | Grade & landscape site | - | 448 | - | - | - | - | - | 67 | 515 | - | - | 515 | - | - | - | - | - | - | 921 | - |
| 3b.1.3 | Final report to NRC | - | - | - | - | - | - | 200 | 30 | 231 | 231 | - | - | - | - | - | - | - | - | - | 1,560 |
| 3b.1 | Subtotal Period 3b Activity Costs | - | 9,251 | - | - | - | - | 200 | 1,418 | 10,869 | 231 | - | 10,639 | - | - | - | - | - | - | 77,859 | 1,560 |
| Period 3b Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 3b.2.1 | Clean Concrete Disposal | - | 2,242 | - | - | - | - | 5 | 337 | 2,583 | - | - | 2,583 | - | - | - | - | - | - | 8,386 | - |
| 3b.2.2 | Intake Structure Cofferdam | - | 623 | - | - | - | - | - | 93 | 716 | - | - | 716 | - | - | - | - | - | - | 5,168 | - |
| 3b.2.3 | Construction Debris | - | - | - | - | - | - | 10 | 2 | 12 | - | - | 12 | - | - | - | - | - | - | - | - |
| 3b.2.4 | Backfill | - | 3,011 | - | - | - | - | - | 452 | 3,462 | - | - | 3,462 | - | - | - | - | - | - | 2,904 | - |

**Prairie Island Nuclear Generating Plant
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**Table C-1
Prairie Island DECON Unit 1
DECON Decommissioning Cost Estimate with DOE Pickup of Industry Spent Fuel Starting in 2035
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial/Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|----------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| 3b.2 | Subtotal Period 3b Additional Costs | - | 5,875 | - | - | - | - | 15 | 883 | 6,773 | - | - | 6,773 | - | - | - | - | - | - | 16,458 | - |
| Period 3b Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 3b.3.1 | Small tool allowance | - | 120 | - | - | - | - | - | 18 | 138 | - | - | 138 | - | - | - | - | - | - | - | - |
| 3b.3.2 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 1,636 | 245 | 1,882 | - | 1,882 | - | - | - | - | - | - | - | - | - |
| 3b.3.3 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 2,649 | - | 2,649 | - | 2,649 | - | - | - | - | - | - | - | - | - |
| 3b.3 | Subtotal Period 3b Collateral Costs | - | 120 | - | - | - | - | 4,285 | 263 | 4,669 | - | 4,531 | 138 | - | - | - | - | - | - | - | - |
| Period 3b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 3b.4.1 | Insurance | - | - | - | - | - | - | 513 | 51 | 565 | 565 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.2 | Property taxes | - | - | - | - | - | - | 4,167 | 417 | 4,583 | - | 4,583 | - | - | - | - | - | - | - | - | - |
| 3b.4.3 | Heavy equipment rental | - | 7,144 | - | - | - | - | - | 1,072 | 8,215 | - | - | 8,215 | - | - | - | - | - | - | - | - |
| 3b.4.4 | Plant energy budget | - | - | - | - | - | - | 344 | 52 | 395 | - | 395 | - | - | - | - | - | - | - | - | - |
| 3b.4.5 | NRC ISFSI Fees | - | - | - | - | - | - | 218 | 22 | 239 | - | 239 | - | - | - | - | - | - | - | - | - |
| 3b.4.6 | Emergency Planning Fees | - | - | - | - | - | - | 157 | 16 | 173 | - | 173 | - | - | - | - | - | - | - | - | - |
| 3b.4.7 | Fixed Overhead | - | - | - | - | - | - | 1,024 | 154 | 1,178 | 397 | 781 | - | - | - | - | - | - | - | - | - |
| 3b.4.8 | ISFSI Operating Costs | - | - | - | - | - | - | 119 | 18 | 136 | - | 136 | - | - | - | - | - | - | - | - | - |
| 3b.4.9 | Railroad Track Maintenance | - | - | - | - | - | - | 361 | 54 | 416 | 153 | 263 | - | - | - | - | - | - | - | - | - |
| 3b.4.10 | Security Staff Cost | - | - | - | - | - | - | 4,616 | 692 | 5,308 | - | 5,308 | - | - | - | - | - | - | - | - | 57,340 |
| 3b.4.11 | DOC Staff Cost | - | - | - | - | - | - | 10,921 | 1,638 | 12,559 | - | - | 12,559 | - | - | - | - | - | - | - | 116,885 |
| 3b.4.12 | Utility Staff Cost | - | - | - | - | - | - | 5,004 | 751 | 5,755 | - | 1,237 | 4,517 | - | - | - | - | - | - | - | 74,431 |
| 3b.4 | Subtotal Period 3b Period-Dependent Costs | - | 7,144 | - | - | - | - | 27,444 | 4,935 | 39,523 | 1,114 | 13,117 | 25,292 | - | - | - | - | - | - | - | 248,656 |
| 3b.0 | TOTAL PERIOD 3b COST | - | 22,390 | - | - | - | - | 31,944 | 7,500 | 61,834 | 1,345 | 17,647 | 42,842 | - | - | - | - | - | - | 94,317 | 250,216 |
| PERIOD 3c - Fuel Storage Operations/Shipping | | | | | | | | | | | | | | | | | | | | | |
| Period 3c Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| Period 3c Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 3c.3.1 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 13,208 | 1,981 | 15,189 | - | 15,189 | - | - | - | - | - | - | - | - | - |
| 3c.3.2 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 40,613 | - | 40,613 | - | 40,613 | - | - | - | - | - | - | - | - | - |
| 3c.3 | Subtotal Period 3c Collateral Costs | - | - | - | - | - | - | 53,820 | 1,981 | 55,801 | - | 55,801 | - | - | - | - | - | - | - | - | - |
| Period 3c Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 3c.4.1 | Insurance | - | - | - | - | - | - | 7,872 | 787 | 8,659 | - | 8,659 | - | - | - | - | - | - | - | - | - |
| 3c.4.2 | Property taxes | - | - | - | - | - | - | 45,095 | 4,509 | 49,604 | - | 49,604 | - | - | - | - | - | - | - | - | - |
| 3c.4.4 | NRC ISFSI Fees | - | - | - | - | - | - | 5,076 | 508 | 5,583 | - | 5,583 | - | - | - | - | - | - | - | - | - |
| 3c.4.5 | Emergency Planning Fees | - | - | - | - | - | - | 2,410 | 241 | 2,651 | - | 2,651 | - | - | - | - | - | - | - | - | - |
| 3c.4.6 | Fixed Overhead | - | - | - | - | - | - | 5,298 | 795 | 6,092 | - | 6,092 | - | - | - | - | - | - | - | - | - |
| 3c.4.7 | ISFSI Operating Costs | - | - | - | - | - | - | 1,820 | 273 | 2,092 | - | 2,092 | - | - | - | - | - | - | - | - | - |
| 3c.4.8 | Railroad Track Maintenance | - | - | - | - | - | - | 2,033 | 305 | 2,338 | - | 2,338 | - | - | - | - | - | - | - | - | - |
| 3c.4.9 | Security Staff Cost | - | - | - | - | - | - | 70,770 | 10,615 | 81,385 | - | 81,385 | - | - | - | - | - | - | - | - | 879,133 |
| 3c.4.10 | Utility Staff Cost | - | - | - | - | - | - | 16,510 | 2,477 | 18,987 | - | 18,987 | - | - | - | - | - | - | - | - | 228,237 |
| 3c.4 | Subtotal Period 3c Period-Dependent Costs | - | - | - | - | - | - | 156,883 | 20,510 | 177,392 | - | 177,392 | - | - | - | - | - | - | - | - | 1,107,370 |
| 3c.0 | TOTAL PERIOD 3c COST | - | - | - | - | - | - | 210,703 | 22,491 | 233,194 | - | 233,194 | - | - | - | - | - | - | - | - | 1,107,370 |
| PERIOD 3d - GTCC shipping | | | | | | | | | | | | | | | | | | | | | |
| Period 3d Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| Nuclear Steam Supply System Removal | | | | | | | | | | | | | | | | | | | | | |
| 3d.1.1.1 | Vessel & Internals GTCC Disposal | - | - | 1,444 | - | - | 8,680 | - | 1,663 | 11,787 | 11,787 | - | - | - | - | - | - | 1,773 | 344,823 | - | - |
| 3d.1.1 | Totals | - | - | 1,444 | - | - | 8,680 | - | 1,663 | 11,787 | 11,787 | - | - | - | - | - | - | 1,773 | 344,823 | - | - |
| 3d.1 | Subtotal Period 3d Activity Costs | - | - | 1,444 | - | - | 8,680 | - | 1,663 | 11,787 | 11,787 | - | - | - | - | - | - | 1,773 | 344,823 | - | - |
| Period 3d Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 3d.3.1 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 48 | - | 48 | - | 48 | - | - | - | - | - | - | - | - | - |
| 3d.3 | Subtotal Period 3d Collateral Costs | - | - | - | - | - | - | 48 | - | 48 | - | 48 | - | - | - | - | - | - | - | - | - |
| Period 3d Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 3d.4.1 | Insurance | - | - | - | - | - | - | 9 | 1 | 10 | 10 | - | - | - | - | - | - | - | - | - | - |
| 3d.4.2 | Property taxes | - | - | - | - | - | - | 53 | 5 | 58 | 58 | - | - | - | - | - | - | - | - | - | - |
| 3d.4.4 | NRC ISFSI Fees | - | - | - | - | - | - | 4 | 0 | 4 | - | 4 | - | - | - | - | - | - | - | - | - |
| 3d.4.5 | Emergency Planning Fees | - | - | - | - | - | - | 3 | 0 | 3 | - | 3 | - | - | - | - | - | - | - | - | - |
| 3d.4.6 | Fixed Overhead | - | - | - | - | - | - | 6 | 1 | 7 | 7 | - | - | - | - | - | - | - | - | - | - |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table C-1
Prairie Island DECON Unit 1
DECON Decommissioning Cost Estimate with DOE Pickup of Industry Spent Fuel Starting in 2035
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|--|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| Period 3d Period-Dependent Costs (continued) | | | | | | | | | | | | | | | | | | | | | |
| 3d.4.7 | Railroad Track Maintenance | - | - | - | - | - | - | 2 | 0 | 3 | 3 | - | - | - | - | - | - | - | - | - | - |
| 3d.4.8 | Security Staff Cost | - | - | - | - | - | - | 83 | 13 | 96 | 96 | - | - | - | - | - | - | - | - | - | 1,037 |
| 3d.4.9 | Utility Staff Cost | - | - | - | - | - | - | 19 | 3 | 22 | 22 | - | - | - | - | - | - | - | - | - | 269 |
| 3d.4 | Subtotal Period 3d Period-Dependent Costs | - | - | - | - | - | - | 181 | 24 | 204 | 197 | 7 | - | - | - | - | - | - | - | - | 1,306 |
| 3d.0 | TOTAL PERIOD 3d COST | - | - | 1,444 | - | - | 8,680 | 229 | 1,687 | 12,039 | 11,984 | 55 | - | - | - | - | - | 1,773 | 344,823 | - | 1,306 |
| PERIOD 3e - ISFSI Decontamination | | | | | | | | | | | | | | | | | | | | | |
| Period 3e Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| Period 3e Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 3e.2.1 | License Termination ISFSI | - | 24 | 81 | 435 | - | 2,532 | 839 | 978 | 4,890 | 4,890 | - | - | - | 9,355 | - | - | - | 1,123,457 | 3,762 | 1,065 |
| 3e.2 | Subtotal Period 3e Additional Costs | - | 24 | 81 | 435 | - | 2,532 | 839 | 978 | 4,890 | 4,890 | - | - | - | 9,355 | - | - | - | 1,123,457 | 3,762 | 1,065 |
| Period 3e Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 3e.4.1 | Insurance | - | - | - | - | - | - | 93 | 23 | 116 | 116 | - | - | - | - | - | - | - | - | - | - |
| 3e.4.2 | Property taxes | - | - | - | - | - | - | 56 | 14 | 69 | 69 | - | - | - | - | - | - | - | - | - | - |
| 3e.4.3 | Plant energy budget | - | - | - | - | - | - | 11 | 3 | 13 | 13 | - | - | - | - | - | - | - | - | - | - |
| 3e.4.4 | Fixed Overhead | - | - | - | - | - | - | 54 | 14 | 68 | 68 | - | - | - | - | - | - | - | - | - | - |
| 3e.4.5 | Railroad Track Maintenance | - | - | - | - | - | - | 21 | 5 | 26 | 26 | - | - | - | - | - | - | - | - | - | - |
| 3e.4.6 | Security Staff Cost | - | - | - | - | - | - | 174 | 43 | 217 | 217 | - | - | - | - | - | - | - | - | - | 2,500 |
| 3e.4.7 | Utility Staff Cost | - | - | - | - | - | - | 129 | 32 | 161 | 161 | - | - | - | - | - | - | - | - | - | 1,896 |
| 3e.4 | Subtotal Period 3e Period-Dependent Costs | - | - | - | - | - | - | 536 | 134 | 670 | 670 | - | - | - | - | - | - | - | - | - | 4,396 |
| 3e.0 | TOTAL PERIOD 3e COST | - | 24 | 81 | 435 | - | 2,532 | 1,375 | 1,112 | 5,560 | 5,560 | - | - | - | 9,355 | - | - | - | 1,123,457 | 3,762 | 5,460 |
| PERIOD 3f - ISFSI Site Restoration | | | | | | | | | | | | | | | | | | | | | |
| Period 3f Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| Period 3f Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 3f.2.1 | Demolition and Site Restoration of ISFSI | - | 515 | - | - | - | - | 68 | 87 | 670 | - | - | 670 | - | - | - | - | - | - | 2,219 | 80 |
| 3f.2 | Subtotal Period 3f Additional Costs | - | 515 | - | - | - | - | 68 | 87 | 670 | - | - | 670 | - | - | - | - | - | - | 2,219 | 80 |
| Period 3f Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 3f.3.1 | Small tool allowance | - | 3 | - | - | - | - | - | 0 | 4 | - | - | 4 | - | - | - | - | - | - | - | - |
| 3f.3 | Subtotal Period 3f Collateral Costs | - | 3 | - | - | - | - | - | 0 | 4 | - | - | 4 | - | - | - | - | - | - | - | - |
| Period 3f Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 3f.4.2 | Property taxes | - | - | - | - | - | - | 28 | 3 | 31 | - | - | 31 | - | - | - | - | - | - | - | - |
| 3f.4.3 | Heavy equipment rental | - | 59 | - | - | - | - | - | 9 | 68 | - | - | 68 | - | - | - | - | - | - | - | - |
| 3f.4.4 | Plant energy budget | - | - | - | - | - | - | 6 | 1 | 6 | - | - | 6 | - | - | - | - | - | - | - | - |
| 3f.4.5 | Fixed Overhead | - | - | - | - | - | - | 28 | 4 | 32 | - | - | 32 | - | - | - | - | - | - | - | - |
| 3f.4.6 | Railroad Track Maintenance | - | - | - | - | - | - | 11 | 2 | 12 | - | - | 12 | - | - | - | - | - | - | - | - |
| 3f.4.7 | Security Staff Cost | - | - | - | - | - | - | 89 | 13 | 102 | - | - | 102 | - | - | - | - | - | - | - | 1,281 |
| 3f.4.8 | Utility Staff Cost | - | - | - | - | - | - | 55 | 8 | 63 | - | - | 63 | - | - | - | - | - | - | - | 795 |
| 3f.4 | Subtotal Period 3f Period-Dependent Costs | - | 59 | - | - | - | - | 216 | 40 | 315 | - | - | 315 | - | - | - | - | - | - | - | 2,076 |
| 3f.0 | TOTAL PERIOD 3f COST | - | 577 | - | - | - | - | 284 | 128 | 989 | - | - | 989 | - | - | - | - | - | - | 2,219 | 2,156 |
| PERIOD 3 TOTALS | | | | | | | | | | | | | | | | | | | | | |
| TOTAL COST TO DECOMMISSION | | | | | | | | | | | | | | | | | | | | | |
| | | 8,929 | 87,309 | 22,838 | 8,068 | 22,651 | 58,542 | 649,313 | 139,103 | 996,753 | 595,962 | 349,793 | 50,998 | 144,866 | 167,555 | 826 | 673 | 1,773 | 15,277,230 | 672,967 | 4,294,963 |

**Prairie Island Nuclear Generating Plant
 Decommissioning Cost Analysis**

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**Table C-1
 Prairie Island DECON Unit 1
 DECON Decommissioning Cost Estimate with DOE Pickup of Industry Spent Fuel Starting in 2035
 (Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial/Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|----------------|----------------------|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|----------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |

| | | | | | | | | | | | | | | | | | | | | | |
|--|--|--|--|--|--|-----------|---------------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| TOTAL COST TO DECOMMISSION WITH 16.22% CONTINGENCY: | | | | | | \$996,753 | thousands of 2020 dollars | | | | | | | | | | | | | | |
| TOTAL NRC LICENSE TERMINATION COST IS 59.79% OR: | | | | | | \$595,962 | thousands of 2020 dollars | | | | | | | | | | | | | | |
| SPENT FUEL MANAGEMENT COST IS 35.09% OR: | | | | | | \$349,793 | thousands of 2020 dollars | | | | | | | | | | | | | | |
| NON-NUCLEAR DEMOLITION COST IS 5.12% OR: | | | | | | \$50,998 | thousands of 2020 dollars | | | | | | | | | | | | | | |
| TOTAL LOW-LEVEL RADIOACTIVE WASTE VOLUME BURIED (EXCLUDING GTCC): | | | | | | 169,054 | Cubic Feet | | | | | | | | | | | | | | |
| TOTAL GREATER THAN CLASS C RADWASTE VOLUME GENERATED: | | | | | | 1,773 | Cubic Feet | | | | | | | | | | | | | | |
| TOTAL SCRAP METAL REMOVED: | | | | | | 32,925 | Tons | | | | | | | | | | | | | | |
| TOTAL CRAFT LABOR REQUIREMENTS: | | | | | | 672,967 | Man-hours | | | | | | | | | | | | | | |

End Notes:
 n/a - indicates that this activity not charged as decommissioning expense
 a - indicates that this activity performed by decommissioning staff
 0 - indicates that this value is less than 0.5 but is non-zero
 A cell containing " - " indicates a zero value

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table C-2
Prairie Island DECON Unit 2
DECON Decommissioning Cost Estimate with DOE Pickup of Industry Spent Fuel Starting in 2035
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|--|--|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| PERIOD 1a - Shutdown through Transition | | | | | | | | | | | | | | | | | | | | | |
| Period 1a Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| 1a.1.1 | Prepare preliminary decommissioning cost | - | - | - | - | - | - | 71 | 11 | 82 | 82 | - | - | - | - | - | - | - | - | - | 556 |
| 1a.1.2 | Notification of Cessation of Operations | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.3 | Remove fuel & source material | - | - | - | - | - | - | - | - | n/a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.4 | Notification of Permanent Defueling | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.5 | Deactivate plant systems & process waste | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.6 | Prepare and submit PSDAR | - | - | - | - | - | - | 110 | 16 | 126 | 126 | - | - | - | - | - | - | - | - | - | 855 |
| 1a.1.7 | Review plant dwgs & specs. | - | - | - | - | - | - | 253 | 38 | 291 | 291 | - | - | - | - | - | - | - | - | - | 1,967 |
| 1a.1.8 | Perform detailed rad survey | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.9 | Estimate by-product inventory | - | - | - | - | - | - | 55 | 8 | 63 | 63 | - | - | - | - | - | - | - | - | - | 428 |
| 1a.1.10 | End product description | - | - | - | - | - | - | 55 | 8 | 63 | 63 | - | - | - | - | - | - | - | - | - | 428 |
| 1a.1.11 | Detailed by-product inventory | - | - | - | - | - | - | 71 | 11 | 82 | 82 | - | - | - | - | - | - | - | - | - | 556 |
| 1a.1.12 | Define major work sequence | - | - | - | - | - | - | 412 | 62 | 474 | 474 | - | - | - | - | - | - | - | - | - | 3,207 |
| 1a.1.13 | Perform SER and EA | - | - | - | - | - | - | 170 | 26 | 196 | 196 | - | - | - | - | - | - | - | - | - | 1,326 |
| 1a.1.14 | Prepare/submit Defueled Technical Specifications | - | - | - | - | - | - | 412 | 62 | 474 | 474 | - | - | - | - | - | - | - | - | - | 3,207 |
| 1a.1.15 | Perform Site-Specific Cost Study | - | - | - | - | - | - | 275 | 41 | 316 | 316 | - | - | - | - | - | - | - | - | - | 2,138 |
| 1a.1.16 | Prepare/submit Irradiated Fuel Management Plan | - | - | - | - | - | - | 55 | 8 | 63 | 63 | - | - | - | - | - | - | - | - | - | 428 |
| Activity Specifications | | | | | | | | | | | | | | | | | | | | | |
| 1a.1.17.1 | Plant & temporary facilities | - | - | - | - | - | - | 270 | 41 | 311 | 280 | - | 31 | - | - | - | - | - | - | - | 2,104 |
| 1a.1.17.2 | Plant systems | - | - | - | - | - | - | 229 | 34 | 263 | 237 | - | 26 | - | - | - | - | - | - | - | 1,782 |
| 1a.1.17.3 | NSSS Decontamination Flush | - | - | - | - | - | - | 27 | 4 | 32 | 32 | - | - | - | - | - | - | - | - | - | 214 |
| 1a.1.17.4 | Reactor internals | - | - | - | - | - | - | 390 | 59 | 449 | 449 | - | - | - | - | - | - | - | - | - | 3,036 |
| 1a.1.17.5 | Reactor vessel | - | - | - | - | - | - | 357 | 54 | 411 | 411 | - | - | - | - | - | - | - | - | - | 2,779 |
| 1a.1.17.6 | Biological shield | - | - | - | - | - | - | 27 | 4 | 32 | 32 | - | - | - | - | - | - | - | - | - | 214 |
| 1a.1.17.7 | Steam generators | - | - | - | - | - | - | 171 | 26 | 197 | 197 | - | - | - | - | - | - | - | - | - | 1,334 |
| 1a.1.17.8 | Reinforced concrete | - | - | - | - | - | - | 88 | 13 | 101 | 51 | - | 51 | - | - | - | - | - | - | - | 684 |
| 1a.1.17.9 | Main Turbine | - | - | - | - | - | - | 22 | 3 | 25 | - | - | 25 | - | - | - | - | - | - | - | 171 |
| 1a.1.17.10 | Main Condensers | - | - | - | - | - | - | 22 | 3 | 25 | - | - | 25 | - | - | - | - | - | - | - | 171 |
| 1a.1.17.11 | Plant structures & buildings | - | - | - | - | - | - | 171 | 26 | 197 | 99 | - | 99 | - | - | - | - | - | - | - | 1,334 |
| 1a.1.17.12 | Waste management | - | - | - | - | - | - | 253 | 38 | 291 | 291 | - | - | - | - | - | - | - | - | - | 1,967 |
| 1a.1.17.13 | Facility & site closeout | - | - | - | - | - | - | 49 | 7 | 57 | 28 | - | 28 | - | - | - | - | - | - | - | 385 |
| 1a.1.17 | Total | - | - | - | - | - | - | 2,079 | 312 | 2,391 | 2,105 | - | 286 | - | - | - | - | - | - | - | 16,175 |
| Planning & Site Preparations | | | | | | | | | | | | | | | | | | | | | |
| 1a.1.18 | Prepare dismantling sequence | - | - | - | - | - | - | 132 | 20 | 152 | 152 | - | - | - | - | - | - | - | - | - | 1,026 |
| 1a.1.19 | Plant prep. & temp. svces | - | - | - | - | - | - | 3,500 | 525 | 4,025 | 4,025 | - | - | - | - | - | - | - | - | - | - |
| 1a.1.20 | Design water clean-up system | - | - | - | - | - | - | 77 | 12 | 88 | 88 | - | - | - | - | - | - | - | - | - | 599 |
| 1a.1.21 | Rigging/Cont. Cntrl Envlp/tooling/etc. | - | - | - | - | - | - | 2,400 | 360 | 2,760 | 2,760 | - | - | - | - | - | - | - | - | - | - |
| 1a.1.22 | Procure casks/liners & containers | - | - | - | - | - | - | 68 | 10 | 78 | 78 | - | - | - | - | - | - | - | - | - | 526 |
| 1a.1 | Subtotal Period 1a Activity Costs | - | - | - | - | - | - | 10,195 | 1,529 | 11,724 | 11,439 | - | 286 | - | - | - | - | - | - | - | 33,420 |
| Period 1a Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 1a.2.1 | Spent Fuel Pool Isolation | - | - | - | - | - | - | 8,450 | 1,268 | 9,718 | 9,718 | - | - | - | - | - | - | - | - | - | - |
| 1a.2 | Subtotal Period 1a Additional Costs | - | - | - | - | - | - | 8,450 | 1,268 | 9,718 | 9,718 | - | - | - | - | - | - | - | - | - | - |
| Period 1a Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 1a.3.1 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 1,330 | 199 | 1,529 | - | 1,529 | - | - | - | - | - | - | - | - | - |
| 1a.3.2 | Retention and Severance | - | - | - | - | - | - | 8,394 | 1,259 | 9,653 | 9,653 | - | - | - | - | - | - | - | - | - | - |
| 1a.3.3 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 1,249 | - | 1,249 | - | 1,249 | - | - | - | - | - | - | - | - | - |
| 1a.3 | Subtotal Period 1a Collateral Costs | - | - | - | - | - | - | 10,973 | 1,459 | 12,432 | 9,653 | 2,779 | - | - | - | - | - | - | - | - | - |
| Period 1a Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 1a.4.1 | Insurance | - | - | - | - | - | - | 1,660 | 166 | 1,826 | 1,826 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.2 | Property taxes | - | - | - | - | - | - | 3,623 | 362 | 3,985 | 3,985 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.3 | Health physics supplies | - | 578 | - | - | - | - | - | 144 | 722 | 722 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.4 | Heavy equipment rental | - | 753 | - | - | - | - | - | 113 | 866 | 866 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.5 | Disposal of DAW generated | - | - | 11 | 5 | - | 47 | - | 13 | 76 | 76 | - | - | 565 | - | - | - | - | 11,299 | 18 | - |
| 1a.4.6 | Plant energy budget | - | - | - | - | - | - | 1,621 | 243 | 1,864 | 1,864 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.7 | NRC Fees | - | - | - | - | - | - | 638 | 64 | 702 | 702 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.8 | Emergency Planning Fees | - | - | - | - | - | - | 2,174 | 217 | 2,392 | - | 2,392 | - | - | - | - | - | - | - | - | - |
| 1a.4.9 | Fixed Overhead | - | - | - | - | - | - | 1,440 | 216 | 1,656 | 1,656 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.10 | Spent Fuel Pool O&M | - | - | - | - | - | - | 422 | 63 | 486 | - | 486 | - | - | - | - | - | - | - | - | - |
| 1a.4.11 | ISFSI Operating Costs | - | - | - | - | - | - | 56 | 8 | 64 | - | 64 | - | - | - | - | - | - | - | - | - |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table C-2
Prairie Island DECON Unit 2
DECON Decommissioning Cost Estimate with DOE Pickup of Industry Spent Fuel Starting in 2035
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|--|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| Period 1a Period-Dependent Costs (continued) | | | | | | | | | | | | | | | | | | | | | |
| 1a.4.12 | Railroad Track Maintenance | - | - | - | - | - | - | 63 | 9 | 72 | 72 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.13 | Security Staff Cost | - | - | - | - | - | - | 8,328 | 1,249 | 9,577 | 9,577 | - | - | - | - | - | - | - | - | - | 122,720 |
| 1a.4.14 | Utility Staff Cost | - | - | - | - | - | - | 21,681 | 3,252 | 24,933 | 24,933 | - | - | - | - | - | - | - | - | - | 345,280 |
| 1a.4 | Subtotal Period 1a Period-Dependent Costs | - | 1,331 | 11 | 5 | - | 47 | 41,706 | 6,122 | 49,221 | 46,279 | 2,942 | - | - | 565 | - | - | - | 11,299 | 18 | 468,000 |
| 1a.0 | TOTAL PERIOD 1a COST | - | 1,331 | 11 | 5 | - | 47 | 71,324 | 10,377 | 83,095 | 77,089 | 5,720 | 286 | - | 565 | - | - | - | 11,299 | 18 | 501,420 |
| PERIOD 1b - Decommissioning Preparations | | | | | | | | | | | | | | | | | | | | | |
| Period 1b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| Detailed Work Procedures | | | | | | | | | | | | | | | | | | | | | |
| 1b.1.1.1 | Plant systems | - | - | - | - | - | - | 260 | 39 | 299 | 269 | - | 30 | - | - | - | - | - | - | - | 2,024 |
| 1b.1.1.2 | NSSS Decontamination Flush | - | - | - | - | - | - | 55 | 8 | 63 | 63 | - | - | - | - | - | - | - | - | - | 428 |
| 1b.1.1.3 | Reactor internals | - | - | - | - | - | - | 137 | 21 | 158 | 158 | - | - | - | - | - | - | - | - | - | 1,069 |
| 1b.1.1.4 | Remaining buildings | - | - | - | - | - | - | 74 | 11 | 85 | 21 | - | 64 | - | - | - | - | - | - | - | 577 |
| 1b.1.1.5 | CRD cooling assembly | - | - | - | - | - | - | 55 | 8 | 63 | 63 | - | - | - | - | - | - | - | - | - | 428 |
| 1b.1.1.6 | CRD housings & ICI tubes | - | - | - | - | - | - | 55 | 8 | 63 | 63 | - | - | - | - | - | - | - | - | - | 428 |
| 1b.1.1.7 | Incore instrumentation | - | - | - | - | - | - | 55 | 8 | 63 | 63 | - | - | - | - | - | - | - | - | - | 428 |
| 1b.1.1.8 | Reactor vessel | - | - | - | - | - | - | 199 | 30 | 229 | 229 | - | - | - | - | - | - | - | - | - | 1,552 |
| 1b.1.1.9 | Facility closeout | - | - | - | - | - | - | 66 | 10 | 76 | 38 | - | 38 | - | - | - | - | - | - | - | 513 |
| 1b.1.1.10 | Missile shields | - | - | - | - | - | - | 25 | 4 | 28 | 28 | - | - | - | - | - | - | - | - | - | 192 |
| 1b.1.1.11 | Biological shield | - | - | - | - | - | - | 66 | 10 | 76 | 76 | - | - | - | - | - | - | - | - | - | 513 |
| 1b.1.1.12 | Steam generators | - | - | - | - | - | - | 253 | 38 | 291 | 291 | - | - | - | - | - | - | - | - | - | 1,967 |
| 1b.1.1.13 | Reinforced concrete | - | - | - | - | - | - | 55 | 8 | 63 | 32 | - | 32 | - | - | - | - | - | - | - | 428 |
| 1b.1.1.14 | Main Turbine | - | - | - | - | - | - | 86 | 13 | 99 | - | - | 99 | - | - | - | - | - | - | - | 667 |
| 1b.1.1.15 | Main Condensers | - | - | - | - | - | - | 86 | 13 | 99 | - | - | 99 | - | - | - | - | - | - | - | 667 |
| 1b.1.1.16 | Auxiliary building | - | - | - | - | - | - | 150 | 23 | 173 | 155 | - | 17 | - | - | - | - | - | - | - | 1,167 |
| 1b.1.1.17 | Reactor building | - | - | - | - | - | - | 150 | 23 | 173 | 155 | - | 17 | - | - | - | - | - | - | - | 1,167 |
| 1b.1.1 | Total | - | - | - | - | - | - | 1,827 | 274 | 2,101 | 1,706 | - | 395 | - | - | - | - | - | - | - | 14,215 |
| 1b.1.2 | Decon primary loop | 572 | - | - | - | - | - | - | 286 | 859 | 859 | - | - | - | - | - | - | - | - | 1,067 | - |
| 1b.1 | Subtotal Period 1b Activity Costs | 572 | - | - | - | - | - | 1,827 | 560 | 2,959 | 2,564 | - | 395 | - | - | - | - | - | - | 1,067 | 14,215 |
| Period 1b Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 1b.2.1 | Site Characterization | - | - | - | - | - | - | 1,505 | 451 | 1,956 | 1,956 | - | - | - | - | - | - | - | - | 8,988 | 3,563 |
| 1b.2.2 | Mixed/Hazardous Waste | - | - | 353 | 94 | 178 | - | - | 76 | 702 | 702 | - | - | 6,132 | - | - | - | - | 351,977 | 2,348 | - |
| 1b.2.3 | Asbestos Abatement | - | 2,526 | 3 | 150 | - | 1,369 | - | 996 | 5,044 | 5,044 | - | - | - | 12,843 | - | - | - | 166,959 | 20,907 | - |
| 1b.2 | Subtotal Period 1b Additional Costs | - | 2,526 | 356 | 244 | 178 | 1,369 | 1,505 | 1,524 | 7,702 | 7,702 | - | - | 6,132 | 12,843 | - | - | - | 518,936 | 32,243 | 3,563 |
| Period 1b Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 1b.3.1 | Decon equipment | 1,055 | - | - | - | - | - | - | 158 | 1,213 | 1,213 | - | - | - | - | - | - | - | - | - | - |
| 1b.3.2 | DOC staff relocation expenses | - | - | - | - | - | - | 1,264 | 190 | 1,454 | 1,454 | - | - | - | - | - | - | - | - | - | - |
| 1b.3.3 | Process decommissioning water waste | 25 | - | 16 | 29 | - | 66 | - | 35 | 172 | 172 | - | - | - | 152 | - | - | - | 9,127 | 30 | - |
| 1b.3.4 | Process decommissioning chemical flush waste | 2 | - | 61 | 199 | - | 3,889 | - | 1,009 | 5,159 | 5,159 | - | - | - | - | - | - | - | 62,689 | 110 | - |
| 1b.3.5 | Small tool allowance | - | 36 | - | - | - | - | - | 5 | 42 | 42 | - | - | - | - | - | - | - | - | - | - |
| 1b.3.6 | Pipe cutting equipment | - | 1,200 | - | - | - | - | - | 180 | 1,380 | 1,380 | - | - | - | - | - | - | - | - | - | - |
| 1b.3.7 | Decon rig | 2,104 | - | - | - | - | - | - | 316 | 2,419 | 2,419 | - | - | - | - | - | - | - | - | - | - |
| 1b.3.8 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 399 | 60 | 459 | - | 459 | - | - | - | - | - | - | - | - | - |
| 1b.3.9 | Retention and Severance | - | - | - | - | - | - | 4,017 | 603 | 4,620 | 4,620 | - | - | - | - | - | - | - | - | - | - |
| 1b.3.10 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 623 | - | 623 | - | 623 | - | - | - | - | - | - | - | - | - |
| 1b.3 | Subtotal Period 1b Collateral Costs | 3,185 | 1,236 | 77 | 228 | - | 3,955 | 6,303 | 2,555 | 17,540 | 16,458 | 1,082 | - | - | 152 | 588 | - | - | 71,815 | 140 | - |
| Period 1b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 1b.4.1 | Decon supplies | 38 | - | - | - | - | - | - | 9 | 47 | 47 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.2 | Insurance | - | - | - | - | - | - | 828 | 83 | 910 | 910 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.3 | Property taxes | - | - | - | - | - | - | 1,713 | 171 | 1,884 | 1,884 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.4 | Health physics supplies | - | 449 | - | - | - | - | - | 112 | 561 | 561 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.5 | Heavy equipment rental | - | 375 | - | - | - | - | - | 56 | 432 | 432 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.6 | Disposal of DAW generated | - | - | 6 | 3 | - | 27 | - | 8 | 43 | 43 | - | - | - | 324 | - | - | - | 6,473 | 11 | - |
| 1b.4.7 | Plant energy budget | - | - | - | - | - | - | 1,617 | 243 | 1,859 | 1,859 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.8 | NRC Fees | - | - | - | - | - | - | 196 | 20 | 216 | 216 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.9 | Emergency Planning Fees | - | - | - | - | - | - | 1,084 | 108 | 1,193 | - | 1,193 | - | - | - | - | - | - | - | - | - |
| 1b.4.10 | Fixed Overhead | - | - | - | - | - | - | 718 | 108 | 826 | 826 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.11 | Spent Fuel Pool O&M | - | - | - | - | - | - | 211 | 32 | 242 | - | 242 | - | - | - | - | - | - | - | - | - |
| 1b.4.12 | ISFSI Operating Costs | - | - | - | - | - | - | 28 | 4 | 32 | - | 32 | - | - | - | - | - | - | - | - | - |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table C-2
Prairie Island DECON Unit 2
DECON Decommissioning Cost Estimate with DOE Pickup of Industry Spent Fuel Starting in 2035
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|--|---|--------------|--------------|-----------------|-----------------|---------------------------|---------------------|----------------|-------------------|----------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| Period 1b Period-Dependent Costs (continued) | | | | | | | | | | | | | | | | | | | | | |
| 1b.4.13 | Railroad Track Maintenance | - | - | - | - | - | - | 31 | 5 | 36 | 36 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.14 | Security Staff Cost | - | - | - | - | - | - | 4,153 | 623 | 4,775 | 4,775 | - | - | - | - | - | - | - | - | - | 61,192 |
| 1b.4.15 | DOC Staff Cost | - | - | - | - | - | - | 4,182 | 627 | 4,810 | 4,810 | - | - | - | - | - | - | - | - | - | 46,672 |
| 1b.4.16 | Utility Staff Cost | - | - | - | - | - | - | 10,811 | 1,622 | 12,432 | 12,432 | - | - | - | - | - | - | - | - | - | 172,167 |
| 1b.4 | Subtotal Period 1b Period-Dependent Costs | 38 | 825 | 6 | 3 | - | 27 | 25,571 | 3,830 | 30,299 | 28,832 | 1,467 | - | - | 324 | - | - | - | 6,473 | 11 | 280,031 |
| 1b.0 | TOTAL PERIOD 1b COST | 3,795 | 4,586 | 440 | 475 | 178 | 5,351 | 35,206 | 8,470 | 58,501 | 55,557 | 2,549 | 395 | 6,132 | 13,319 | 588 | - | - | 597,225 | 33,460 | 297,808 |
| PERIOD 1 TOTALS | | 3,795 | 5,917 | 451 | 479 | 178 | 5,398 | 106,531 | 18,847 | 141,595 | 132,646 | 8,269 | 681 | 6,132 | 13,884 | 588 | - | - | 608,524 | 33,478 | 799,228 |
| PERIOD 2a - Large Component Removal | | | | | | | | | | | | | | | | | | | | | |
| Period 2a Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| Nuclear Steam Supply System Removal | | | | | | | | | | | | | | | | | | | | | |
| 2a.1.1.1 | Reactor Coolant Piping | 54 | 47 | 10 | 18 | - | 187 | - | 89 | 406 | 406 | - | - | - | 508 | - | - | - | 35,411 | 1,421 | - |
| 2a.1.1.2 | Pressurizer Relief Tank | 24 | 21 | 6 | 12 | - | 125 | - | 51 | 238 | 238 | - | - | - | 338 | - | - | - | 23,594 | 630 | - |
| 2a.1.1.3 | Reactor Coolant Pumps & Motors | 57 | 68 | 110 | 93 | - | 463 | - | 186 | 977 | 977 | - | - | - | 2,332 | - | - | - | 295,800 | 2,049 | 100 |
| 2a.1.1.4 | Pressurizer | - | 77 | 503 | 97 | - | 776 | - | 278 | 1,732 | 1,732 | - | - | - | 2,196 | - | - | - | 185,015 | 1,666 | 938 |
| 2a.1.1.5 | Steam Generators | - | 3,307 | 2,269 | 1,770 | 2,409 | 4,001 | - | 2,681 | 16,437 | 16,437 | - | - | 18,672 | 11,316 | - | - | - | 1,689,435 | 11,613 | 2,875 |
| 2a.1.1.6 | CRDMs/ICIs/Service Structure Removal | 302 | 281 | 218 | 66 | - | 938 | - | 488 | 2,294 | 2,294 | - | - | - | 4,797 | - | - | - | 177,400 | 8,104 | - |
| 2a.1.1.7 | Reactor Vessel Internals | 82 | 4,861 | 13,621 | 929 | - | 9,015 | 307 | 11,878 | 40,693 | 40,693 | - | - | - | 501 | 125 | 673 | - | 164,987 | 25,123 | 1,163 |
| 2a.1.1.8 | Reactor Vessel | 94 | 6,046 | 2,028 | 728 | - | 2,975 | 307 | 6,804 | 18,982 | 18,982 | - | - | - | 8,073 | - | - | - | 576,524 | 25,123 | 1,163 |
| 2a.1.1 | Totals | 613 | 14,709 | 18,764 | 3,714 | 2,409 | 18,480 | 614 | 22,455 | 81,759 | 81,759 | - | - | 18,672 | 30,062 | 125 | 673 | - | 3,148,166 | 75,729 | 6,240 |
| Removal of Major Equipment | | | | | | | | | | | | | | | | | | | | | |
| 2a.1.2 | Main Turbine/Generator | - | 331 | 172 | 64 | 527 | 377 | - | 283 | 1,752 | 1,752 | - | - | 2,131 | 1,187 | - | - | - | 203,265 | 4,667 | - |
| 2a.1.3 | Main Condensers | - | 2,801 | 109 | 62 | 705 | 533 | - | 960 | 5,170 | 5,170 | - | - | 3,800 | 1,587 | - | - | - | 271,824 | 39,151 | - |
| Cascading Costs from Clean Building Demolition | | | | | | | | | | | | | | | | | | | | | |
| 2a.1.4.1 | Reactor | - | 794 | - | - | - | - | - | 119 | 913 | 913 | - | - | - | - | - | - | - | - | 7,589 | - |
| 2a.1.4.2 | Auxiliary | - | 221 | - | - | - | - | - | 33 | 254 | 254 | - | - | - | - | - | - | - | - | 1,309 | - |
| 2a.1.4.3 | Radwaste | - | 9 | - | - | - | - | - | 1 | 10 | 10 | - | - | - | - | - | - | - | - | 65 | - |
| 2a.1.4 | Totals | - | 1,023 | - | - | - | - | - | 154 | 1,177 | 1,177 | - | - | - | - | - | - | - | - | 8,963 | - |
| Disposal of Plant Systems | | | | | | | | | | | | | | | | | | | | | |
| 2a.1.5.1 | Admin Bldg Ventilation | - | 6 | - | - | - | - | - | 1 | 7 | - | - | 7 | - | - | - | - | - | - | 90 | - |
| 2a.1.5.2 | Air Removal | - | 29 | - | - | - | - | - | 4 | 33 | - | - | 33 | - | - | - | - | - | - | 422 | - |
| 2a.1.5.3 | Auxiliary Feedwater | - | 46 | - | - | - | - | - | 7 | 53 | - | - | 53 | - | - | - | - | - | - | 676 | - |
| 2a.1.5.4 | Auxiliary Feedwater - RCA | - | 38 | 0 | 1 | 30 | - | - | 14 | 84 | 84 | - | - | 178 | - | - | - | - | 7,214 | 486 | - |
| 2a.1.5.5 | Bleed Steam | - | 90 | - | - | - | - | - | 13 | 103 | - | - | 103 | - | - | - | - | - | - | 1,331 | - |
| 2a.1.5.6 | Caustic Addition - RCA | - | 40 | 0 | 2 | 40 | - | - | 16 | 99 | 99 | - | - | 240 | - | - | - | - | 9,761 | 468 | - |
| 2a.1.5.7 | Chemical Feed | - | 17 | - | - | - | - | - | 3 | 20 | - | - | 20 | - | - | - | - | - | - | 261 | - |
| 2a.1.5.8 | Chemical Feed - RCA | - | 3 | 0 | 0 | 3 | - | - | 1 | 7 | 7 | - | - | 16 | - | - | - | - | 634 | 31 | - |
| 2a.1.5.9 | Circulating Water | - | 27 | - | - | - | - | - | 4 | 32 | - | - | 32 | - | - | - | - | - | - | 401 | - |
| 2a.1.5.10 | Condensate | - | 525 | - | - | - | - | - | 79 | 603 | - | - | 603 | - | - | - | - | - | - | 7,537 | - |
| 2a.1.5.11 | Condensate Polishing | - | 208 | - | - | - | - | - | 31 | 239 | - | - | 239 | - | - | - | - | - | - | 2,987 | - |
| 2a.1.5.12 | Condensate Polishing - RCA | - | 38 | 1 | 4 | 81 | - | - | 22 | 145 | 145 | - | - | 483 | - | - | - | - | 19,616 | 493 | - |
| 2a.1.5.13 | Electro-Hydraulic | - | 10 | - | - | - | - | - | 1 | 11 | - | - | 11 | - | - | - | - | - | - | 143 | - |
| 2a.1.5.14 | External Circulating Water | - | 26 | - | - | - | - | - | 4 | 30 | - | - | 30 | - | - | - | - | - | - | 385 | - |
| 2a.1.5.15 | External Circulating Water - RCA | - | 72 | 1 | 5 | 121 | - | - | 37 | 237 | 237 | - | - | 721 | - | - | - | - | 29,284 | 938 | - |
| 2a.1.5.16 | Feedwater | - | 127 | - | - | - | - | - | 19 | 146 | - | - | 146 | - | - | - | - | - | - | 1,840 | - |
| 2a.1.5.17 | Feedwater - RCA | - | 248 | 8 | 31 | 694 | - | - | 171 | 1,152 | 1,152 | - | - | 4,147 | - | - | - | - | 168,414 | 3,377 | - |
| 2a.1.5.18 | Gland Seal | - | 34 | - | - | - | - | - | 5 | 39 | - | - | 39 | - | - | - | - | - | - | 504 | - |
| 2a.1.5.19 | Heater Drain | - | 384 | - | - | - | - | - | 58 | 441 | - | - | 441 | - | - | - | - | - | - | 5,638 | - |
| 2a.1.5.20 | Hypobromous Acid Feed | - | 6 | - | - | - | - | - | 1 | 7 | - | - | 7 | - | - | - | - | - | - | 86 | - |
| 2a.1.5.21 | Hypobromous Acid Feed - RCA | - | 1 | 0 | 0 | 0 | - | - | 0 | 2 | 2 | - | - | 2 | - | - | - | - | 100 | 12 | - |
| 2a.1.5.22 | Internal Circ Water & CDSR | - | 25 | - | - | - | - | - | 4 | 29 | - | - | 29 | - | - | - | - | - | - | 366 | - |
| 2a.1.5.23 | Main Gen/Exciter/Transformer | - | 0 | - | - | - | - | - | 0 | 0 | - | - | 0 | - | - | - | - | - | - | 5 | - |
| 2a.1.5.24 | Main Steam | - | 101 | - | - | - | - | - | 15 | 116 | - | - | 116 | - | - | - | - | - | - | 1,482 | - |
| 2a.1.5.25 | Main Steam - RCA | - | 380 | 11 | 38 | 864 | - | - | 231 | 1,525 | 1,525 | - | - | 5,166 | - | - | - | - | 209,799 | 5,146 | - |
| 2a.1.5.26 | Repairable Spare Snubbers | - | 6 | 0 | 0 | 2 | - | - | 2 | 10 | 10 | - | - | 12 | - | - | - | - | 490 | 82 | - |
| 2a.1.5.27 | Steam Exclusion | - | 2 | - | - | - | - | - | 0 | 2 | - | - | 2 | - | - | - | - | - | - | 32 | - |
| 2a.1.5.28 | Steam Exclusion - RCA | - | 4 | 0 | 0 | 4 | - | - | 2 | 10 | 10 | - | - | 24 | - | - | - | - | 966 | 47 | - |
| 2a.1.5.29 | Steam Generator Blowdown | - | 416 | 21 | 27 | 319 | 215 | - | 212 | 1,210 | 1,210 | - | - | 1,906 | 631 | - | - | - | 118,130 | 5,778 | - |
| 2a.1.5.30 | Steam Generators | - | 5 | - | - | - | - | - | 1 | 6 | - | - | 6 | - | - | - | - | - | - | 75 | - |
| 2a.1.5.31 | Turbine & Moisture Separators | - | 377 | - | - | - | - | - | 57 | 434 | - | - | 434 | - | - | - | - | - | - | 5,472 | - |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table C-2
Prairie Island DECON Unit 2
DECON Decommissioning Cost Estimate with DOE Pickup of Industry Spent Fuel Starting in 2035
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|---------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| Disposal of Plant Systems (continued) | | | | | | | | | | | | | | | | | | | | | | |
| 2a.1.5.32 | Turbine Oil Purification | - | 53 | - | - | - | - | - | 8 | 61 | - | - | 61 | - | - | - | - | - | - | - | 757 | - |
| 2a.1.5.33 | Water Treatment | - | 453 | - | - | - | - | - | 68 | 521 | - | - | 521 | - | - | - | - | - | - | - | 6,677 | - |
| 2a.1.5.34 | Water Treatment - RCA | - | 20 | 0 | 1 | 19 | - | - | 8 | 49 | 49 | - | - | 115 | - | - | - | - | - | 4,652 | 252 | - |
| 2a.1.5 | Totals | - | 3,817 | 43 | 108 | 2,177 | 215 | - | 1,100 | 7,461 | 4,528 | - | 2,933 | 13,010 | 631 | - | - | - | - | 569,060 | 54,280 | - |
| 2a.1.6 | Scaffolding in support of decommissioning | - | 3,020 | 22 | 10 | 188 | 30 | - | 794 | 4,064 | 4,064 | - | - | 1,012 | 89 | - | - | - | - | 51,216 | 26,270 | - |
| 2a.1 | Subtotal Period 2a Activity Costs | 613 | 25,702 | 19,110 | 3,959 | 6,005 | 19,635 | 614 | 25,745 | 101,384 | 98,450 | - | 2,933 | 38,625 | 33,556 | 125 | 673 | - | - | 4,243,531 | 209,060 | 6,240 |
| Period 2a Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 2a.2.1 | Retired RPV Upper Internals Package | - | 257 | 387 | 217 | - | 1,394 | - | 1,041 | 3,296 | 3,296 | - | - | - | 376 | 112 | - | - | - | 50,164 | 3,333 | 133 |
| 2a.2 | Subtotal Period 2a Additional Costs | - | 257 | 387 | 217 | - | 1,394 | - | 1,041 | 3,296 | 3,296 | - | - | - | 376 | 112 | - | - | - | 50,164 | 3,333 | 133 |
| Period 2a Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 2a.3.1 | Process decommissioning water waste | 49 | - | 33 | 60 | - | 134 | - | 70 | 347 | 347 | - | - | - | 308 | - | - | - | - | 18,487 | 60 | - |
| 2a.3.3 | Small tool allowance | - | 269 | - | - | - | - | - | 40 | 309 | 278 | - | 31 | - | - | - | - | - | - | - | - | - |
| 2a.3.4 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 8,862 | 1,329 | 10,192 | - | 10,192 | - | - | - | - | - | - | - | - | - | - |
| 2a.3.5 | Retention and Severance | - | - | - | - | - | - | 8,215 | 1,232 | 9,447 | - | - | - | - | - | - | - | - | - | - | - | - |
| 2a.3.6 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 1,780 | - | 1,780 | - | 1,780 | - | - | - | - | - | - | - | - | - | - |
| 2a.3 | Subtotal Period 2a Collateral Costs | 49 | 269 | 33 | 60 | - | 134 | 18,857 | 2,672 | 22,074 | 10,072 | 11,971 | 31 | - | 308 | - | - | - | - | 18,487 | 60 | - |
| Period 2a Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 2a.4.1 | Decon supplies | 107 | - | - | - | - | - | - | 27 | 134 | 134 | - | - | - | - | - | - | - | - | - | - | - |
| 2a.4.2 | Insurance | - | - | - | - | - | - | 690 | 69 | 759 | 759 | - | - | - | - | - | - | - | - | - | - | - |
| 2a.4.3 | Property taxes | - | - | - | - | - | - | 4,548 | 455 | 5,002 | 5,002 | - | - | - | - | - | - | - | - | - | - | - |
| 2a.4.4 | Health physics supplies | - | 2,103 | - | - | - | - | - | 526 | 2,629 | 2,629 | - | - | - | - | - | - | - | - | - | - | - |
| 2a.4.5 | Heavy equipment rental | - | 3,565 | - | - | - | - | - | 535 | 4,100 | 4,100 | - | - | - | - | - | - | - | - | - | - | - |
| 2a.4.6 | Disposal of DAW generated | - | - | 86 | 35 | - | 358 | - | 103 | 582 | - | - | - | - | 4,345 | - | - | - | - | 86,891 | 142 | - |
| 2a.4.7 | Plant energy budget | - | - | - | - | - | - | 2,194 | 329 | 2,523 | 2,523 | - | - | - | - | - | - | - | - | - | - | - |
| 2a.4.8 | NRC Fees | - | - | - | - | - | - | 526 | 53 | 578 | 578 | - | - | - | - | - | - | - | - | - | - | - |
| 2a.4.9 | Emergency Planning Fees | - | - | - | - | - | - | 2,647 | 265 | 2,912 | - | 2,912 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.10 | Fixed Overhead | - | - | - | - | - | - | 1,695 | 254 | 1,949 | 1,949 | - | - | - | - | - | - | - | - | - | - | - |
| 2a.4.11 | Spent Fuel Pool O&M | - | - | - | - | - | - | 602 | 90 | 692 | - | 692 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.12 | ISFSI Operating Costs | - | - | - | - | - | - | 80 | 12 | 92 | - | 92 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.13 | Railroad Track Maintenance | - | - | - | - | - | - | 318 | 48 | 366 | 366 | - | - | - | - | - | - | - | - | - | - | - |
| 2a.4.14 | Remedial Actions Surveys | - | - | - | - | - | - | 1,596 | 239 | 1,835 | 1,835 | - | - | - | - | - | - | - | - | - | - | - |
| 2a.4.15 | Security Staff Cost | - | - | - | - | - | - | 10,900 | 1,635 | 12,534 | 12,534 | - | - | - | - | - | - | - | - | - | - | 160,018 |
| 2a.4.16 | DOC Staff Cost | - | - | - | - | - | - | 20,663 | 3,099 | 23,763 | 23,763 | - | - | - | - | - | - | - | - | - | - | 225,210 |
| 2a.4.17 | Utility Staff Cost | - | - | - | - | - | - | 27,056 | 4,058 | 31,115 | 31,115 | - | - | - | - | - | - | - | - | - | - | 419,049 |
| 2a.4 | Subtotal Period 2a Period-Dependent Costs | 107 | 5,668 | 86 | 35 | - | 358 | 73,514 | 11,797 | 91,565 | 87,870 | 3,696 | - | - | 4,345 | - | - | - | - | 86,891 | 142 | 804,276 |
| 2a.0 | TOTAL PERIOD 2a COST | 770 | 31,895 | 19,616 | 4,270 | 6,005 | 21,522 | 92,985 | 41,255 | 218,319 | 199,687 | 15,667 | 2,964 | 38,625 | 38,584 | 237 | 673 | - | - | 4,399,073 | 212,595 | 810,649 |
| PERIOD 2b - Site Decontamination | | | | | | | | | | | | | | | | | | | | | | |
| Period 2b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Disposal of Plant Systems | | | | | | | | | | | | | | | | | | | | | | |
| 2b.1.1.1 | ADT & Misc Ventilation | - | 25 | 1 | 1 | 26 | 3 | - | 11 | 66 | 66 | - | - | 153 | 9 | - | - | - | - | 6,803 | 363 | - |
| 2b.1.1.2 | Aux Bldg Normal Ventilation | - | 69 | 2 | 6 | 116 | 13 | - | 39 | 246 | 246 | - | - | 692 | 39 | - | - | - | - | 30,595 | 1,013 | - |
| 2b.1.1.3 | Aux Bldg Special Ventilation | - | 14 | 0 | 1 | 12 | 2 | - | 6 | 34 | 34 | - | - | 70 | 6 | - | - | - | - | 3,234 | 197 | - |
| 2b.1.1.4 | Battery Rm Special Ventilation | - | 2 | - | - | - | - | - | 0 | 2 | - | - | 2 | - | - | - | - | - | - | - | 24 | - |
| 2b.1.1.5 | Boron Recycle | 0 | 4 | 0 | 0 | 0 | 3 | - | 2 | 10 | 10 | - | - | 3 | 9 | - | - | - | - | 700 | 50 | - |
| 2b.1.1.6 | Chemical & Volume Control | 749 | 942 | 62 | 57 | 394 | 677 | - | 853 | 3,736 | 3,736 | - | - | 2,356 | 1,977 | - | - | - | - | 223,753 | 23,197 | - |
| 2b.1.1.7 | Cold Chemical Lab Ventilation | - | 1 | - | - | - | - | - | 0 | 1 | - | - | 1 | - | - | - | - | - | - | - | 9 | - |
| 2b.1.1.8 | Component Cooling - RCA | - | 647 | 25 | 88 | 2,007 | - | - | 479 | 3,246 | 3,246 | - | - | 11,996 | - | - | - | - | - | 487,169 | 8,583 | - |
| 2b.1.1.9 | Containment Cooling | - | 35 | - | - | - | - | - | 5 | 40 | - | - | 40 | - | - | - | - | - | - | - | 502 | - |
| 2b.1.1.10 | Containment Cooling - RCA | - | 302 | 6 | 20 | 459 | - | - | 148 | 934 | 934 | - | - | 2,743 | - | - | - | - | - | 111,390 | 3,949 | - |
| 2b.1.1.11 | Containment Hydrogen Control - RCA | - | 36 | 0 | 1 | 24 | - | - | 13 | 74 | 74 | - | - | 141 | - | - | - | - | - | 5,742 | 494 | - |
| 2b.1.1.12 | Containment Spray - RCA | - | 194 | 3 | 11 | 243 | - | - | 87 | 538 | 538 | - | - | 1,453 | - | - | - | - | - | 59,019 | 2,617 | - |
| 2b.1.1.13 | Containment Ventilation | - | 235 | 23 | 49 | 790 | 243 | - | 248 | 1,587 | 1,587 | - | - | 4,721 | 722 | - | - | - | - | 237,643 | 3,375 | - |
| 2b.1.1.14 | Control/Relay/Cmpt Rm Vent | - | 31 | 1 | 2 | 44 | 7 | - | 17 | 102 | 102 | - | - | 260 | 20 | - | - | - | - | 11,878 | 454 | - |
| 2b.1.1.15 | Cooling Water | - | 159 | - | - | - | - | - | 24 | 183 | - | - | 183 | - | - | - | - | - | - | - | 2,344 | - |
| 2b.1.1.16 | Cooling Water - RCA | - | 476 | 17 | 62 | 1,412 | - | - | 342 | 2,310 | 2,310 | - | - | 8,442 | - | - | - | - | - | 342,822 | 6,311 | - |
| 2b.1.1.17 | Cranes/Hoists/Elevators - RCA | - | 3 | 0 | 1 | 17 | - | - | 4 | 25 | 25 | - | - | 103 | - | - | - | - | - | 4,184 | 48 | - |
| 2b.1.1.18 | D3 Emergency Diesel | - | 10 | - | - | - | - | - | 2 | 12 | - | - | 12 | - | - | - | - | - | - | - | 141 | - |
| 2b.1.1.19 | D4 Emergency Diesel | - | 10 | - | - | - | - | - | 2 | 12 | - | - | 12 | - | - | - | - | - | - | - | 141 | - |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table C-2
Prairie Island DECON Unit 2
DECON Decommissioning Cost Estimate with DOE Pickup of Industry Spent Fuel Starting in 2035
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|---------------------------------------|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|-------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| Disposal of Plant Systems (continued) | | | | | | | | | | | | | | | | | | | | | | |
| 2b.1.1.20 | D5 Emergency Diesel | - | 0 | - | - | - | - | - | 0 | 0 | - | - | 0 | - | - | - | - | - | - | - | 5 | - |
| 2b.1.1.21 | Electrical - Clean | - | 1,714 | - | - | - | - | - | 257 | 1,972 | - | - | 1,972 | - | - | - | - | - | - | - | 24,276 | - |
| 2b.1.1.22 | Electrical - Contaminated | - | 475 | 5 | 16 | 334 | 25 | - | 178 | 1,034 | 1,034 | - | - | 1,997 | 75 | - | - | - | - | 85,887 | 6,503 | - |
| 2b.1.1.23 | Electrical - Decontaminated | - | 2,955 | 38 | 138 | 3,138 | - | - | 1,234 | 7,503 | 7,503 | - | - | 18,753 | - | - | - | - | - | 761,569 | 38,423 | - |
| 2b.1.1.24 | Filter Rm Ventilation | - | 5 | 0 | 0 | 4 | 0 | - | 2 | 11 | 11 | - | - | 24 | 1 | - | - | - | - | 1,017 | 69 | - |
| 2b.1.1.25 | Fire Protection & Detection | - | 204 | - | - | - | - | - | 31 | 235 | - | - | 235 | - | - | - | - | - | - | - | 3,009 | - |
| 2b.1.1.26 | Fire Protection & Detection - RCA | - | 246 | 4 | 13 | 306 | - | - | 110 | 679 | 679 | - | - | 1,828 | - | - | - | - | - | 74,245 | 3,134 | - |
| 2b.1.1.27 | Fuel Handling | - | 74 | 1 | 2 | 34 | 17 | - | 28 | 156 | 156 | - | - | 200 | 49 | - | - | - | - | 11,273 | 1,101 | - |
| 2b.1.1.28 | Fuel Oil | - | 1 | - | - | - | - | - | 0 | 1 | - | - | 1 | - | - | - | - | - | - | - | 9 | - |
| 2b.1.1.29 | HVAC - Clean | - | 151 | - | - | - | - | - | 23 | 174 | - | - | 174 | - | - | - | - | - | - | - | 2,373 | - |
| 2b.1.1.30 | HVAC - Contaminated | - | 1,231 | 29 | 87 | 1,798 | 136 | - | 627 | 3,908 | 3,908 | - | - | 10,745 | 405 | - | - | - | - | 462,103 | 16,579 | - |
| 2b.1.1.31 | Heating | - | 322 | - | - | - | - | - | 48 | 370 | - | - | 370 | - | - | - | - | - | - | - | 4,804 | - |
| 2b.1.1.32 | Heating - RCA | - | 337 | 4 | 14 | 319 | - | - | 135 | 809 | 809 | - | - | 1,907 | - | - | - | - | - | 77,458 | 4,086 | - |
| 2b.1.1.33 | Hot Lab & Sample Rm Ventilation | - | 20 | 0 | 1 | 18 | 1 | - | 8 | 48 | 48 | - | - | 107 | 4 | - | - | - | - | 4,622 | 285 | - |
| 2b.1.1.34 | Incore Instrumentation | 0 | 30 | 1 | 2 | 10 | 20 | - | 14 | 77 | 77 | - | - | 60 | 58 | - | - | - | - | 6,143 | 458 | - |
| 2b.1.1.35 | Misc Drains & Vents | - | 234 | 12 | 12 | 77 | 145 | - | 109 | 590 | 590 | - | - | 458 | 426 | - | - | - | - | 46,079 | 3,180 | - |
| 2b.1.1.36 | Misc Lab & Service Areas Vent | - | 129 | 8 | 8 | 62 | 84 | - | 65 | 356 | 356 | - | - | 370 | 244 | - | - | - | - | 30,899 | 1,713 | - |
| 2b.1.1.37 | Miscellaneous Gas | - | 72 | - | - | - | - | - | 11 | 83 | - | - | 83 | - | - | - | - | - | - | - | 1,073 | - |
| 2b.1.1.38 | Miscellaneous Gas - RCA | - | 134 | 1 | 4 | 100 | - | - | 49 | 289 | 289 | - | - | 600 | - | - | - | - | - | 24,378 | 1,636 | - |
| 2b.1.1.39 | Radiation Monitoring | - | 7 | - | - | - | - | - | 1 | 9 | - | - | 9 | - | - | - | - | - | - | - | 111 | - |
| 2b.1.1.40 | Radiation Monitoring - RCA | - | 65 | 1 | 2 | 53 | - | - | 25 | 145 | 145 | - | - | 316 | - | - | - | - | - | 12,826 | 782 | - |
| 2b.1.1.41 | Reactor Coolant | 163 | 236 | 20 | 16 | 38 | 249 | - | 213 | 937 | 937 | - | - | 229 | 730 | - | - | - | - | 56,440 | 5,517 | - |
| 2b.1.1.42 | Reactor Hot Sampling | 140 | 126 | 11 | 7 | 9 | 108 | - | 132 | 533 | 533 | - | - | 54 | 312 | - | - | - | - | 22,678 | 3,686 | - |
| 2b.1.1.43 | Reactor Makeup | - | 41 | - | - | - | - | - | 6 | 47 | - | - | 47 | - | - | - | - | - | - | - | 583 | - |
| 2b.1.1.44 | Reactor Makeup - RCA | - | 4 | 0 | 0 | 5 | - | - | 2 | 11 | 11 | - | - | 28 | - | - | - | - | - | 1,148 | 47 | - |
| 2b.1.1.45 | Reactor Vessel | 9 | 18 | 1 | 0 | 4 | 5 | - | 11 | 47 | 47 | - | - | 22 | 14 | - | - | - | - | 1,816 | 385 | - |
| 2b.1.1.46 | Residual Heat Removal | 348 | 393 | 84 | 86 | 477 | 1,102 | - | 641 | 3,132 | 3,132 | - | - | 2,853 | 3,244 | - | - | - | - | 324,232 | 7,112 | - |
| 2b.1.1.47 | Safeguards Chilled Water | - | 5 | - | - | - | - | - | 1 | 6 | - | - | 6 | - | - | - | - | - | - | - | 75 | - |
| 2b.1.1.48 | Safety Injection | - | 874 | 42 | 72 | 1,117 | 395 | - | 500 | 3,000 | 3,000 | - | - | 6,676 | 1,161 | - | - | - | - | 345,708 | 12,284 | - |
| 2b.1.1.49 | Sampling | - | 52 | 3 | 2 | 6 | 32 | - | 23 | 119 | 119 | - | - | 37 | 93 | - | - | - | - | 7,628 | 714 | - |
| 2b.1.1.50 | Service Bldg & New Cmpt Vent | - | 0 | - | - | - | - | - | 0 | 0 | - | - | 0 | - | - | - | - | - | - | - | 6 | - |
| 2b.1.1.51 | Shield Bldg Ventilation | - | 120 | 13 | 25 | 339 | 163 | - | 127 | 787 | 787 | - | - | 2,028 | 484 | - | - | - | - | 113,139 | 1,743 | - |
| 2b.1.1.52 | Station & Instrument Air | - | 161 | - | - | - | - | - | 24 | 185 | - | - | 185 | - | - | - | - | - | - | - | 2,424 | - |
| 2b.1.1.53 | Station & Instrument Air - RCA | - | 299 | 3 | 12 | 272 | - | - | 118 | 704 | 704 | - | - | 1,625 | - | - | - | - | - | 65,986 | 3,638 | - |
| 2b.1.1.54 | Turbine Bldg Traps & Drains | - | 30 | - | - | - | - | - | 5 | 35 | - | - | 35 | - | - | - | - | - | - | - | 462 | - |
| 2b.1.1.55 | Turbine Bldg Traps & Drains - RCA | - | 30 | 0 | 1 | 30 | - | - | 12 | 73 | 73 | - | - | 180 | - | - | - | - | - | 7,321 | 344 | - |
| 2b.1.1.56 | Turbine Bldg Ventilation | - | 46 | - | - | - | - | - | 7 | 53 | - | - | 53 | - | - | - | - | - | - | - | 655 | - |
| 2b.1.1.57 | Unit Coolers | - | 23 | - | - | - | - | - | 3 | 26 | - | - | 26 | - | - | - | - | - | - | - | 332 | - |
| 2b.1.1.58 | Unit Coolers - RCA | - | 56 | 0 | 2 | 39 | - | - | 20 | 117 | 117 | - | - | 232 | - | - | - | - | - | 9,413 | 690 | - |
| 2b.1.1.59 | Waste Gas Disposal | 553 | 479 | 43 | 45 | 410 | 464 | - | 585 | 2,581 | 2,581 | - | - | 2,453 | 1,358 | - | - | - | - | 187,339 | 14,308 | - |
| 2b.1.1.60 | Waste Liquid Disposal | 1,436 | 1,800 | 116 | 100 | 612 | 1,234 | - | 1,595 | 6,893 | 6,893 | - | - | 3,655 | 3,594 | - | - | - | - | 381,754 | 44,485 | - |
| 2b.1.1.61 | Waste Solid Disposal | 115 | 145 | 12 | 11 | 65 | 134 | - | 140 | 622 | 622 | - | - | 389 | 393 | - | - | - | - | 41,177 | 3,481 | - |
| 2b.1.1 | Totals | 3,515 | 16,542 | 596 | 980 | 15,220 | 5,264 | - | 9,399 | 51,516 | 48,072 | - | 3,444 | 90,963 | 15,429 | - | - | - | - | 4,689,210 | 270,390 | - |
| 2b.1.2 | Scaffolding in support of decommissioning | - | 3,775 | 27 | 13 | 235 | 37 | - | 993 | 5,081 | 5,081 | - | - | 1,265 | 112 | - | - | - | - | 64,020 | 32,837 | - |
| Decontamination of Site Buildings | | | | | | | | | | | | | | | | | | | | | | |
| 2b.1.3.1 | Reactor | 1,215 | 2,808 | 240 | 1,236 | 373 | 13,625 | - | 4,981 | 24,479 | 24,479 | - | - | 2,230 | 83,434 | - | - | - | - | 3,633,771 | 50,962 | - |
| 2b.1.3.2 | Auxiliary | 1,292 | 422 | 23 | 117 | 177 | 648 | - | 960 | 3,639 | 3,639 | - | - | 1,060 | 6,118 | - | - | - | - | 332,495 | 23,821 | - |
| 2b.1.3.3 | Backwash Waste Receiving Tank | - | 28 | 3 | 17 | - | 97 | - | 34 | 179 | 179 | - | - | - | 929 | - | - | - | - | 43,896 | 301 | - |
| 2b.1.3.4 | Drum Transfer & Truck Loading Enclosure | 18 | 9 | 1 | 3 | 3 | 14 | - | 16 | 63 | 63 | - | - | 19 | 135 | - | - | - | - | 7,118 | 369 | - |
| 2b.1.3.5 | LLRW Storage Enclosure | 123 | 54 | 3 | 17 | 6 | 96 | - | 103 | 403 | 403 | - | - | 38 | 920 | - | - | - | - | 44,971 | 2,426 | - |
| 2b.1.3.6 | Radwaste | 55 | 24 | 1 | 8 | 7 | 43 | - | 47 | 185 | 185 | - | - | 42 | 412 | - | - | - | - | 21,136 | 1,083 | - |
| 2b.1.3.7 | Resin Disposal | 16 | 12 | 1 | 3 | 14 | 14 | - | 17 | 76 | 76 | - | - | 83 | 124 | - | - | - | - | 9,271 | 383 | - |
| 2b.1.3 | Totals | 2,720 | 3,357 | 271 | 1,400 | 581 | 14,537 | - | 6,158 | 29,024 | 29,024 | - | - | 3,471 | 92,071 | - | - | - | - | 4,092,658 | 79,343 | - |
| 2b.1.4 | Prepare/submit License Termination Plan | - | - | - | - | - | - | 225 | 34 | 259 | 259 | - | - | - | - | - | - | - | - | - | - | 1,751 |
| 2b.1.5 | Receive NRC approval of termination plan | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - | - |
| 2b.1 | Subtotal Period 2b Activity Costs | 6,235 | 23,674 | 895 | 2,393 | 16,035 | 19,839 | 225 | 16,584 | 85,879 | 82,435 | - | 3,444 | 95,700 | 107,611 | - | - | - | - | 8,845,887 | 382,570 | 1,751 |
| Period 2b Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 2b.2.1 | Operational Equipment | - | - | 11 | 36 | 606 | - | - | 97 | 751 | 751 | - | - | 5,880 | - | - | - | - | - | 147,000 | 16 | - |
| 2b.2.2 | Excavation of Underground Services | - | 1,175 | - | - | - | - | 225 | 328 | 1,728 | 1,728 | - | - | - | - | - | - | - | - | - | 7,411 | - |
| 2b.2.3 | Security Modifications | - | - | - | - | - | - | 4,348 | 652 | 5,000 | 5,000 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.2 | Subtotal Period 2b Additional Costs | - | 1,175 | 11 | 36 | 606 | - | 4,573 | 1,077 | 7,478 | 7,478 | - | - | 5,880 | - | - | - | - | - | 147,000 | 7,427 | - |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table C-2
Prairie Island DECON Unit 2
DECON Decommissioning Cost Estimate with DOE Pickup of Industry Spent Fuel Starting in 2035
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| Period 2b Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 2b.3.1 | Process decommissioning water waste | 166 | - | 113 | 203 | - | 456 | - | 239 | 1,176 | 1,176 | - | - | - | 1,047 | - | - | - | 62,844 | 204 | - |
| 2b.3.2 | Process decommissioning chemical flush waste | 3 | - | 119 | 390 | - | 893 | - | 295 | 1,699 | 1,699 | - | - | - | 1,154 | - | - | - | 122,948 | 216 | - |
| 2b.3.3 | Small tool allowance | - | 446 | - | - | - | - | - | 67 | 513 | 513 | - | - | - | - | - | - | - | - | - | - |
| 2b.3.4 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 49,770 | 7,465 | 57,235 | - | 57,235 | - | - | - | - | - | - | - | - | - |
| 2b.3.5 | Retention and Severance | - | - | - | - | - | - | 2,839 | 426 | 3,265 | 3,265 | - | - | - | - | - | - | - | - | - | - |
| 2b.3.6 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 1,348 | - | 1,348 | - | 1,348 | - | - | - | - | - | - | - | - | - |
| 2b.3.7 | On-site survey and release of 0.437 tons clean metallic waste | - | - | - | - | - | - | 1 | 0 | 1 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.3 | Subtotal Period 2b Collateral Costs | 169 | 446 | 232 | 592 | - | 1,349 | 53,958 | 8,492 | 65,237 | 6,654 | 58,583 | - | - | 2,201 | - | - | - | 185,792 | 420 | - |
| Period 2b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 2b.4.1 | Decon supplies | 1,219 | - | - | - | - | - | - | 305 | 1,524 | 1,524 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.2 | Insurance | - | - | - | - | - | - | 523 | 52 | 575 | 575 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.3 | Property taxes | - | - | - | - | - | - | 3,075 | 308 | 3,383 | 3,383 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.4 | Health physics supplies | - | 2,866 | - | - | - | - | - | 716 | 3,582 | 3,582 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.5 | Heavy equipment rental | - | 2,774 | - | - | - | - | - | 416 | 3,190 | 3,190 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.6 | Disposal of DAW generated | - | - | 103 | 42 | - | 429 | - | 124 | 698 | 698 | - | - | - | 5,209 | - | - | - | 104,172 | 170 | - |
| 2b.4.7 | Plant energy budget | - | - | - | - | - | - | 1,313 | 197 | 1,509 | 1,509 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.8 | NRC Fees | - | - | - | - | - | - | 398 | 40 | 438 | 438 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.9 | Emergency Planning Fees | - | - | - | - | - | - | 2,006 | 201 | 2,207 | - | 2,207 | - | - | - | - | - | - | - | - | - |
| 2b.4.10 | Fixed Overhead | - | - | - | - | - | - | 1,284 | 193 | 1,477 | 1,477 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.11 | Spent Fuel Pool O&M | - | - | - | - | - | - | 456 | 68 | 524 | - | 524 | - | - | - | - | - | - | - | - | - |
| 2b.4.12 | Liquid Radwaste Processing Equipment/Services | - | - | - | - | - | - | 229 | 34 | 264 | 264 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.13 | ISFSI Operating Costs | - | - | - | - | - | - | 60 | 9 | 69 | - | 69 | - | - | - | - | - | - | - | - | - |
| 2b.4.14 | Railroad Track Maintenance | - | - | - | - | - | - | 67 | 10 | 78 | 78 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.15 | Remedial Actions Surveys | - | - | - | - | - | - | 1,209 | 181 | 1,391 | 1,391 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.16 | Security Staff Cost | - | - | - | - | - | - | 8,259 | 1,239 | 9,497 | 9,497 | - | - | - | - | - | - | - | - | - | 121,244 |
| 2b.4.17 | DOC Staff Cost | - | - | - | - | - | - | 15,117 | 2,268 | 17,385 | 17,385 | - | - | - | - | - | - | - | - | - | 163,904 |
| 2b.4.18 | Utility Staff Cost | - | - | - | - | - | - | 19,642 | 2,946 | 22,588 | 22,588 | - | - | - | - | - | - | - | - | - | 304,233 |
| 2b.4 | Subtotal Period 2b Period-Dependent Costs | 1,219 | 5,640 | 103 | 42 | - | 429 | 53,639 | 9,307 | 70,380 | 67,579 | 2,800 | - | - | 5,209 | - | - | - | 104,172 | 170 | 589,381 |
| 2b.0 | TOTAL PERIOD 2b COST | 7,623 | 30,935 | 1,242 | 3,063 | 16,641 | 21,617 | 112,395 | 35,460 | 228,975 | 164,147 | 61,384 | 3,444 | 101,580 | 115,021 | - | - | - | 9,282,851 | 390,587 | 591,132 |
| PERIOD 2d - Decontamination Following Wet Fuel Storage | | | | | | | | | | | | | | | | | | | | | |
| Period 2d Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| 2d.1.1 | Remove spent fuel racks | 347 | 35 | 86 | 41 | - | 703 | - | 373 | 1,585 | 1,585 | - | - | - | 2,092 | - | - | - | 132,919 | 576 | - |
| Disposal of Plant Systems | | | | | | | | | | | | | | | | | | | | | |
| 2d.1.2.1 | Electrical - Contaminated - Fuel Pool | - | 203 | 2 | 7 | 145 | 11 | - | 77 | 445 | 445 | - | - | 864 | 33 | - | - | - | 37,167 | 2,783 | - |
| 2d.1.2.2 | Electrical - Decontaminated - Fuel Pool | - | 1,269 | 17 | 59 | 1,350 | - | - | 530 | 3,225 | 3,225 | - | - | 8,069 | - | - | - | - | 327,668 | 16,495 | - |
| 2d.1.2.3 | Fire Protection & Detection - RCA Fuel P | - | 37 | 1 | 2 | 48 | - | - | 17 | 105 | 105 | - | - | 286 | - | - | - | - | 11,622 | 476 | - |
| 2d.1.2.4 | HVAC - Contaminated - Fuel Pool | - | 553 | 13 | 39 | 808 | 61 | - | 282 | 1,756 | 1,756 | - | - | 4,828 | 182 | - | - | - | 207,612 | 7,448 | - |
| 2d.1.2.5 | Safeguards Chilled Water - RCA | - | 5 | 0 | 0 | 4 | - | - | 2 | 11 | 11 | - | - | 26 | - | - | - | - | 1,045 | 51 | - |
| 2d.1.2.6 | Spent Fuel Pool Cooling | 32 | 36 | 3 | 2 | 6 | 37 | - | 36 | 152 | 152 | - | - | 39 | 107 | - | - | - | 8,481 | 882 | - |
| 2d.1.2.7 | Spent Fuel Pool Normal Ventilation | - | 27 | 1 | 2 | 44 | 4 | - | 15 | 93 | 93 | - | - | 265 | 12 | - | - | - | 11,505 | 394 | - |
| 2d.1.2 | Totals | 32 | 2,130 | 36 | 112 | 2,405 | 113 | - | 958 | 5,786 | 5,786 | - | - | 14,376 | 333 | - | - | - | 605,100 | 28,530 | - |
| Decontamination of Site Buildings | | | | | | | | | | | | | | | | | | | | | |
| 2d.1.3.1 | Fuel Handling of Aux Building | 1,029 | 1,138 | 13 | 45 | 404 | 195 | - | 916 | 3,741 | 3,741 | - | - | 2,417 | 1,652 | - | - | - | 177,755 | 30,404 | - |
| 2d.1.3 | Totals | 1,029 | 1,138 | 13 | 45 | 404 | 195 | - | 916 | 3,741 | 3,741 | - | - | 2,417 | 1,652 | - | - | - | 177,755 | 30,404 | - |
| 2d.1.4 | Scaffolding in support of decommissioning | - | 755 | 5 | 3 | 47 | 7 | - | 199 | 1,016 | 1,016 | - | - | 253 | 22 | - | - | - | 12,804 | 6,567 | - |
| 2d.1 | Subtotal Period 2d Activity Costs | 1,408 | 4,058 | 141 | 202 | 2,857 | 1,018 | - | 2,445 | 12,128 | 12,128 | - | - | 17,046 | 4,099 | - | - | - | 928,579 | 66,078 | - |
| Period 2d Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 2d.2.1 | License Termination Survey Planning | - | - | - | - | - | - | 1,037 | 311 | 1,348 | 1,348 | - | - | - | - | - | - | - | - | - | 6,240 |
| 2d.2 | Subtotal Period 2d Additional Costs | - | - | - | - | - | - | 1,037 | 311 | 1,348 | 1,348 | - | - | - | - | - | - | - | - | - | 6,240 |
| Period 2d Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 2d.3.1 | Process decommissioning water waste | 45 | - | 31 | 56 | - | 126 | - | 65 | 323 | 323 | - | - | - | 288 | - | - | - | 17,293 | 56 | - |
| 2d.3.2 | Process decommissioning chemical flush waste | 0 | - | 1 | 5 | - | 10 | - | 3 | 20 | 20 | - | - | - | 13 | - | - | - | 1,422 | 2 | - |
| 2d.3.3 | Small tool allowance | - | 83 | - | - | - | - | - | 12 | 95 | 95 | - | - | - | - | - | - | - | - | - | - |
| 2d.3.4 | Decommissioning Equipment Disposition | - | - | 130 | 67 | 1,112 | 178 | - | 234 | 1,722 | 1,722 | - | - | 6,000 | 529 | - | - | - | 303,608 | 147 | - |
| 2d.3.5 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 1,159 | 174 | 1,333 | - | 1,333 | - | - | - | - | - | - | - | - | - |
| 2d.3.6 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 975 | - | 975 | - | 975 | - | - | - | - | - | - | - | - | - |
| 2d.3 | Subtotal Period 2d Collateral Costs | 45 | 83 | 162 | 128 | 1,112 | 314 | 2,135 | 490 | 4,468 | 2,160 | 2,308 | - | 6,000 | 831 | - | - | - | 322,324 | 206 | - |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table C-2
Prairie Island DECON Unit 2
DECON Decommissioning Cost Estimate with DOE Pickup of Industry Spent Fuel Starting in 2035
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|---|---------------|---------------|-----------------|-----------------|---------------------------|---------------------|----------------|-------------------|----------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| Period 2d Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 2d.4.1 | Decon supplies | 236 | - | - | - | - | - | - | 59 | 295 | 295 | - | - | - | - | - | - | - | - | - | - |
| 2d.4.2 | Insurance | - | - | - | - | - | - | 378 | 38 | 416 | 416 | - | - | - | - | - | - | - | - | - | - |
| 2d.4.3 | Property taxes | - | - | - | - | - | - | 2,004 | 200 | 2,204 | 2,204 | - | - | - | - | - | - | - | - | - | - |
| 2d.4.4 | Health physics supplies | - | 794 | - | - | - | - | - | 198 | 992 | 992 | - | - | - | - | - | - | - | - | - | - |
| 2d.4.5 | Heavy equipment rental | - | 2,007 | - | - | - | - | - | 301 | 2,308 | 2,308 | - | - | - | - | - | - | - | - | - | - |
| 2d.4.6 | Disposal of DAW generated | - | - | 40 | 16 | - | 165 | - | 48 | 268 | 268 | - | - | - | 2,002 | - | - | - | 40,031 | 65 | - |
| 2d.4.7 | Plant energy budget | - | - | - | - | - | - | 506 | 76 | 582 | 582 | - | - | - | - | - | - | - | - | - | - |
| 2d.4.8 | NRC Fees | - | - | - | - | - | - | 277 | 28 | 305 | 305 | - | - | - | - | - | - | - | - | - | - |
| 2d.4.9 | Emergency Planning Fees | - | - | - | - | - | - | 58 | 6 | 64 | - | 64 | - | - | - | - | - | - | - | - | - |
| 2d.4.10 | Fixed Overhead | - | - | - | - | - | - | 929 | 139 | 1,068 | 1,068 | - | - | - | - | - | - | - | - | - | - |
| 2d.4.11 | Liquid Radwaste Processing Equipment/Services | - | - | - | - | - | - | 332 | 50 | 381 | 381 | - | - | - | - | - | - | - | - | - | - |
| 2d.4.12 | ISFSI Operating Costs | - | - | - | - | - | - | 44 | 7 | 50 | - | 50 | - | - | - | - | - | - | - | - | - |
| 2d.4.13 | Railroad Track Maintenance | - | - | - | - | - | - | 49 | 7 | 56 | 56 | - | - | - | - | - | - | - | - | - | - |
| 2d.4.14 | Remedial Actions Surveys | - | - | - | - | - | - | 875 | 131 | 1,006 | 1,006 | - | - | - | - | - | - | - | - | - | - |
| 2d.4.15 | Security Staff Cost | - | - | - | - | - | - | 5,782 | 867 | 6,649 | 4,694 | 1,955 | - | - | - | - | - | - | - | - | 84,454 |
| 2d.4.16 | DOC Staff Cost | - | - | - | - | - | - | 6,401 | 960 | 7,361 | 7,361 | - | - | - | - | - | - | - | - | - | 70,243 |
| 2d.4.17 | Utility Staff Cost | - | - | - | - | - | - | 8,100 | 1,215 | 9,315 | 8,858 | 456 | - | - | - | - | - | - | - | - | 126,681 |
| 2d.4 | Subtotal Period 2d Period-Dependent Costs | 236 | 2,801 | 40 | 16 | - | 165 | - | 4,330 | 33,321 | 30,796 | 2,525 | - | - | 2,002 | - | - | - | 40,031 | 65 | 281,377 |
| 2d.0 | TOTAL PERIOD 2d COST | 1,689 | 6,941 | 343 | 346 | 3,969 | 1,496 | 28,905 | 7,576 | 51,265 | 46,432 | 4,834 | - | 23,046 | 6,931 | - | - | - | 1,290,933 | 66,348 | 287,617 |
| PERIOD 2f - License Termination | | | | | | | | | | | | | | | | | | | | | |
| Period 2f Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| 2f.1.1 | ORISE confirmatory survey | - | - | - | - | - | - | 166 | 50 | 216 | 216 | - | - | - | - | - | - | - | - | - | - |
| 2f.1.2 | Terminate license | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 2f.1 | Subtotal Period 2f Activity Costs | - | - | - | - | - | - | 166 | 50 | 216 | 216 | - | - | - | - | - | - | - | - | - | - |
| Period 2f Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 2f.2.1 | License Termination Survey | - | - | - | - | - | - | 7,041 | 2,112 | 9,154 | 9,154 | - | - | - | - | - | - | - | - | 100,895 | 3,120 |
| 2f.2 | Subtotal Period 2f Additional Costs | - | - | - | - | - | - | 7,041 | 2,112 | 9,154 | 9,154 | - | - | - | - | - | - | - | - | 100,895 | 3,120 |
| Period 2f Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 2f.3.1 | DOC staff relocation expenses | - | - | - | - | - | - | 1,264 | 190 | 1,454 | 1,454 | - | - | - | - | - | - | - | - | - | - |
| 2f.3.2 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 603 | 90 | 693 | - | 693 | - | - | - | - | - | - | - | - | - |
| 2f.3.3 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 934 | - | 934 | - | 934 | - | - | - | - | - | - | - | - | - |
| 2f.3 | Subtotal Period 2f Collateral Costs | - | - | - | - | - | - | 2,801 | 280 | 3,081 | 1,454 | 1,628 | - | - | - | - | - | - | - | - | - |
| Period 2f Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 2f.4.1 | Insurance | - | - | - | - | - | - | 362 | 36 | 398 | 398 | - | - | - | - | - | - | - | - | - | - |
| 2f.4.2 | Property taxes | - | - | - | - | - | - | 1,771 | 177 | 1,948 | 1,948 | - | - | - | - | - | - | - | - | - | - |
| 2f.4.3 | Health physics supplies | - | 710 | - | - | - | - | - | 178 | 888 | 888 | - | - | - | - | - | - | - | - | - | - |
| 2f.4.4 | Disposal of DAW generated | - | - | 7 | 3 | - | 28 | - | 8 | 45 | 45 | - | - | 334 | - | - | - | - | 6,685 | 11 | - |
| 2f.4.5 | Plant energy budget | - | - | - | - | - | - | 243 | 36 | 279 | 279 | - | - | - | - | - | - | - | - | - | - |
| 2f.4.6 | NRC Fees | - | - | - | - | - | - | 263 | 26 | 290 | 290 | - | - | - | - | - | - | - | - | - | - |
| 2f.4.7 | Emergency Planning Fees | - | - | - | - | - | - | 55 | 6 | 61 | - | 61 | - | - | - | - | - | - | - | - | - |
| 2f.4.8 | Fixed Overhead | - | - | - | - | - | - | 890 | 133 | 1,023 | 1,023 | - | - | - | - | - | - | - | - | - | - |
| 2f.4.9 | ISFSI Operating Costs | - | - | - | - | - | - | 42 | 6 | 48 | - | 48 | - | - | - | - | - | - | - | - | - |
| 2f.4.10 | Railroad Track Maintenance | - | - | - | - | - | - | 47 | 7 | 54 | 54 | - | - | - | - | - | - | - | - | - | - |
| 2f.4.11 | Security Staff Cost | - | - | - | - | - | - | 5,538 | 831 | 6,369 | 4,497 | 1,873 | - | - | - | - | - | - | - | - | 80,898 |
| 2f.4.12 | DOC Staff Cost | - | - | - | - | - | - | 4,238 | 636 | 4,874 | 4,874 | - | - | - | - | - | - | - | - | - | 46,283 |
| 2f.4.13 | Utility Staff Cost | - | - | - | - | - | - | 4,011 | 602 | 4,613 | 4,175 | 438 | - | - | - | - | - | - | - | - | 59,507 |
| 2f.4 | Subtotal Period 2f Period-Dependent Costs | - | 710 | 7 | 3 | - | 28 | 17,461 | 2,682 | 20,890 | 18,470 | 2,420 | - | - | 334 | - | - | - | 6,685 | 11 | 186,687 |
| 2f.0 | TOTAL PERIOD 2f COST | - | 710 | 7 | 3 | - | 28 | 27,470 | 5,124 | 33,341 | 29,294 | 4,048 | - | - | 334 | - | - | - | 6,685 | 100,906 | 189,807 |
| PERIOD 2 TOTALS | | 10,081 | 70,482 | 21,208 | 7,682 | 26,615 | 44,663 | 261,754 | 89,416 | 531,900 | 439,560 | 85,932 | 6,408 | 163,252 | 160,871 | 237 | 673 | - | 14,979,540 | 770,436 | 1,879,206 |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table C-2
Prairie Island DECON Unit 2
DECON Decommissioning Cost Estimate with DOE Pickup of Industry Spent Fuel Starting in 2035
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|---------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| PERIOD 3b - Site Restoration | | | | | | | | | | | | | | | | | | | | | | |
| Period 3b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Demolition of Remaining Site Buildings | | | | | | | | | | | | | | | | | | | | | | |
| 3b.1.1.1 | Reactor | - | 4,645 | - | - | - | - | - | 697 | 5,342 | - | - | 5,342 | - | - | - | - | - | - | - | 44,679 | - |
| 3b.1.1.2 | Auxiliary | - | 1,993 | - | - | - | - | - | 299 | 2,291 | - | - | 2,291 | - | - | - | - | - | - | - | 11,902 | - |
| 3b.1.1.3 | Condensate Storage Tank Foundation | - | 7 | - | - | - | - | - | 1 | 8 | - | - | 8 | - | - | - | - | - | - | - | 33 | - |
| 3b.1.1.4 | Construction Warehouse & Fab Shop | - | 130 | - | - | - | - | - | 19 | 149 | - | - | 149 | - | - | - | - | - | - | - | 1,405 | - |
| 3b.1.1.5 | D3/D4 Emergency Generator | - | 14 | - | - | - | - | - | 2 | 16 | - | - | 16 | - | - | - | - | - | - | - | 84 | - |
| 3b.1.1.6 | Drum Transfer & Truck Loading Enclosure | - | 20 | - | - | - | - | - | 3 | 24 | - | - | 24 | - | - | - | - | - | - | - | 221 | - |
| 3b.1.1.7 | Hydrogen House | - | 6 | - | - | - | - | - | 1 | 7 | - | - | 7 | - | - | - | - | - | - | - | 47 | - |
| 3b.1.1.8 | LLRW Storage Enclosure | - | 128 | - | - | - | - | - | 19 | 147 | - | - | 147 | - | - | - | - | - | - | - | 853 | - |
| 3b.1.1.9 | Misc Structures 2017 | - | 2,617 | - | - | - | - | - | 393 | 3,009 | - | - | 3,009 | - | - | - | - | - | - | - | 22,582 | - |
| 3b.1.1.10 | Radwaste | - | 176 | - | - | - | - | - | 26 | 202 | - | - | 202 | - | - | - | - | - | - | - | 1,400 | - |
| 3b.1.1.11 | Resin Disposal | - | 14 | - | - | - | - | - | 2 | 16 | - | - | 16 | - | - | - | - | - | - | - | 120 | - |
| 3b.1.1.12 | Structures below 3' below grade | - | 1,785 | - | - | - | - | - | 268 | 2,052 | - | - | 2,052 | - | - | - | - | - | - | - | 9,238 | - |
| 3b.1.1.13 | Sulfuric Acid Tank Enclosure | - | 3 | - | - | - | - | - | 0 | 4 | - | - | 4 | - | - | - | - | - | - | - | 35 | - |
| 3b.1.1.14 | Turbine | - | 2,140 | - | - | - | - | - | 321 | 2,461 | - | - | 2,461 | - | - | - | - | - | - | - | 21,997 | - |
| 3b.1.1.15 | Turbine Pedestal | - | 365 | - | - | - | - | - | 55 | 420 | - | - | 420 | - | - | - | - | - | - | - | 1,857 | - |
| 3b.1.1.16 | Warehouse #2 | - | 24 | - | - | - | - | - | 4 | 27 | - | - | 27 | - | - | - | - | - | - | - | 213 | - |
| 3b.1.1.17 | Waste Neutralizing Tank House | - | 7 | - | - | - | - | - | 1 | 8 | - | - | 8 | - | - | - | - | - | - | - | 56 | - |
| 3b.1.1.18 | Waste Oil Storage | - | 9 | - | - | - | - | - | 1 | 10 | - | - | 10 | - | - | - | - | - | - | - | 70 | - |
| 3b.1.1.19 | Water Treatment | - | 324 | - | - | - | - | - | 49 | 373 | - | - | 373 | - | - | - | - | - | - | - | 2,690 | - |
| 3b.1.1.20 | Fuel Handling of Aux Building | - | 1,095 | - | - | - | - | - | 164 | 1,259 | - | - | 1,259 | - | - | - | - | - | - | - | 8,240 | - |
| 3b.1.1 | Totals | - | 15,501 | - | - | - | - | - | 2,325 | 17,826 | - | - | 17,826 | - | - | - | - | - | - | - | 127,723 | - |
| Site Closeout Activities | | | | | | | | | | | | | | | | | | | | | | |
| 3b.1.2 | Remove Rubble | - | 1,330 | - | - | - | - | - | 200 | 1,530 | - | - | 1,530 | - | - | - | - | - | - | - | 6,495 | - |
| 3b.1.3 | Grade & landscape site | - | 448 | - | - | - | - | - | 67 | 515 | - | - | 515 | - | - | - | - | - | - | - | 921 | - |
| 3b.1.4 | Final report to NRC | - | - | - | - | - | - | 86 | 13 | 99 | 99 | - | - | - | - | - | - | - | - | - | - | 667 |
| 3b.1 | Subtotal Period 3b Activity Costs | - | 17,279 | - | - | - | - | 86 | 2,605 | 19,969 | 99 | - | 19,871 | - | - | - | - | - | - | - | 135,138 | 667 |
| Period 3b Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3b.2.1 | Clean Concrete Disposal | - | 4,912 | - | - | - | - | 10 | 738 | 5,660 | - | - | 5,660 | - | - | - | - | - | - | - | 18,372 | - |
| 3b.2.2 | Intake Structure Cofferdam | - | 442 | - | - | - | - | - | 66 | 508 | - | - | 508 | - | - | - | - | - | - | - | 3,552 | - |
| 3b.2.3 | Construction Debris | - | - | - | - | - | - | 2,150 | 323 | 2,473 | - | - | 2,473 | - | - | - | - | - | - | - | - | - |
| 3b.2.4 | Backfill | - | 9,257 | - | - | - | - | - | 1,388 | 10,645 | - | - | 10,645 | - | - | - | - | - | - | - | 9,327 | - |
| 3b.2 | Subtotal Period 3b Additional Costs | - | 14,610 | - | - | - | - | 2,160 | 2,516 | 19,286 | - | - | 19,286 | - | - | - | - | - | - | - | 31,251 | - |
| Period 3b Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3b.3.1 | Small tool allowance | - | 212 | - | - | - | - | - | 32 | 244 | - | - | 244 | - | - | - | - | - | - | - | - | - |
| 3b.3.2 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 1,636 | 245 | 1,882 | - | 1,882 | - | - | - | - | - | - | - | - | - | - |
| 3b.3.3 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 2,649 | - | 2,649 | - | - | 2,649 | - | - | - | - | - | - | - | - | - |
| 3b.3 | Subtotal Period 3b Collateral Costs | - | 212 | - | - | - | - | 4,285 | 277 | 4,774 | - | 4,531 | 244 | - | - | - | - | - | - | - | - | - |
| Period 3b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3b.4.1 | Insurance | - | - | - | - | - | - | 513 | 51 | 565 | 565 | - | - | - | - | - | - | - | - | - | - | - |
| 3b.4.2 | Property taxes | - | - | - | - | - | - | 4,167 | 417 | 4,583 | - | 4,583 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.3 | Heavy equipment rental | - | 7,144 | - | - | - | - | - | 1,072 | 8,215 | - | - | 8,215 | - | - | - | - | - | - | - | - | - |
| 3b.4.4 | Plant energy budget | - | - | - | - | - | - | 344 | 52 | 395 | - | 395 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.5 | NRC ISFSI Fees | - | - | - | - | - | - | 218 | 22 | 239 | - | 239 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.6 | Emergency Planning Fees | - | - | - | - | - | - | 157 | 16 | 173 | - | 173 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.7 | Fixed Overhead | - | - | - | - | - | - | 1,024 | 154 | 1,178 | 397 | 781 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.8 | ISFSI Operating Costs | - | - | - | - | - | - | 119 | 18 | 136 | - | 136 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.9 | Railroad Track Maintenance | - | - | - | - | - | - | 361 | 54 | 416 | 153 | 263 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.10 | Security Staff Cost | - | - | - | - | - | - | 4,616 | 692 | 5,308 | - | 5,308 | - | - | - | - | - | - | - | - | - | 57,340 |
| 3b.4.11 | DOC Staff Cost | - | - | - | - | - | - | 10,921 | 1,638 | 12,559 | - | - | 12,559 | - | - | - | - | - | - | - | - | 116,885 |
| 3b.4.12 | Utility Staff Cost | - | - | - | - | - | - | 5,004 | 751 | 5,755 | - | 1,237 | 4,517 | - | - | - | - | - | - | - | - | 74,431 |
| 3b.4 | Subtotal Period 3b Period-Dependent Costs | - | 7,144 | - | - | - | - | 27,444 | 4,935 | 39,523 | 1,114 | 13,117 | 25,292 | - | - | - | - | - | - | - | - | 248,656 |
| 3b.0 | TOTAL PERIOD 3b COST | - | 39,245 | - | - | - | - | 33,975 | 10,333 | 83,552 | 1,213 | 17,647 | 64,692 | - | - | - | - | - | - | - | 166,388 | 249,323 |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table C-2
Prairie Island DECON Unit 2
DECON Decommissioning Cost Estimate with DOE Pickup of Industry Spent Fuel Starting in 2035
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|-----------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| PERIOD 3c - Fuel Storage Operations/Shipping | | | | | | | | | | | | | | | | | | | | | | |
| Period 3c Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Period 3c Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3c.3.1 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 13,208 | 1,981 | 15,189 | - | 15,189 | - | - | - | - | - | - | - | - | - | - |
| 3c.3.2 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 40,613 | - | 40,613 | - | 40,613 | - | - | - | - | - | - | - | - | - | - |
| 3c.3 | Subtotal Period 3c Collateral Costs | - | - | - | - | - | - | 53,820 | 1,981 | 55,801 | - | 55,801 | - | - | - | - | - | - | - | - | - | - |
| Period 3c Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3c.4.1 | Insurance | - | - | - | - | - | - | 7,872 | 787 | 8,659 | - | 8,659 | - | - | - | - | - | - | - | - | - | - |
| 3c.4.2 | Property taxes | - | - | - | - | - | - | 45,095 | 4,509 | 49,604 | - | 49,604 | - | - | - | - | - | - | - | - | - | - |
| 3c.4.4 | NRC ISFSI Fees | - | - | - | - | - | - | 5,076 | 508 | 5,583 | - | 5,583 | - | - | - | - | - | - | - | - | - | - |
| 3c.4.5 | Emergency Planning Fees | - | - | - | - | - | - | 2,410 | 241 | 2,651 | - | 2,651 | - | - | - | - | - | - | - | - | - | - |
| 3c.4.6 | Fixed Overhead | - | - | - | - | - | - | 5,298 | 795 | 6,092 | - | 6,092 | - | - | - | - | - | - | - | - | - | - |
| 3c.4.7 | ISFSI Operating Costs | - | - | - | - | - | - | 1,820 | 273 | 2,092 | - | 2,092 | - | - | - | - | - | - | - | - | - | - |
| 3c.4.8 | Railroad Track Maintenance | - | - | - | - | - | - | 2,033 | 305 | 2,338 | - | 2,338 | - | - | - | - | - | - | - | - | - | - |
| 3c.4.9 | Security Staff Cost | - | - | - | - | - | - | 70,770 | 10,615 | 81,385 | - | 81,385 | - | - | - | - | - | - | - | - | - | 879,133 |
| 3c.4.10 | Utility Staff Cost | - | - | - | - | - | - | 16,510 | 2,477 | 18,987 | - | 18,987 | - | - | - | - | - | - | - | - | - | 228,237 |
| 3c.4 | Subtotal Period 3c Period-Dependent Costs | - | - | - | - | - | - | 156,883 | 20,510 | 177,392 | - | 177,392 | - | - | - | - | - | - | - | - | - | 1,107,370 |
| 3c.0 | TOTAL PERIOD 3c COST | - | - | - | - | - | - | 210,703 | 22,491 | 233,194 | - | 233,194 | - | - | - | - | - | - | - | - | - | 1,107,370 |
| PERIOD 3d - GTCC shipping | | | | | | | | | | | | | | | | | | | | | | |
| Period 3d Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Nuclear Steam Supply System Removal | | | | | | | | | | | | | | | | | | | | | | |
| 3d.1.1.1 | Vessel & Internals GTCC Disposal | - | - | 1,444 | - | - | - | 8,680 | 1,663 | 11,787 | 11,787 | - | - | - | - | - | - | 1,773 | 344,823 | - | - | - |
| 3d.1.1 | Totals | - | - | 1,444 | - | - | - | 8,680 | 1,663 | 11,787 | 11,787 | - | - | - | - | - | - | 1,773 | 344,823 | - | - | - |
| 3d.1 | Subtotal Period 3d Activity Costs | - | - | 1,444 | - | - | - | 8,680 | 1,663 | 11,787 | 11,787 | - | - | - | - | - | - | 1,773 | 344,823 | - | - | - |
| Period 3d Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3d.3.1 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 48 | - | 48 | - | 48 | - | - | - | - | - | - | - | - | - | - |
| 3d.3 | Subtotal Period 3d Collateral Costs | - | - | - | - | - | - | 48 | - | 48 | - | 48 | - | - | - | - | - | - | - | - | - | - |
| Period 3d Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3d.4.1 | Insurance | - | - | - | - | - | - | 9 | 1 | 10 | 10 | - | - | - | - | - | - | - | - | - | - | - |
| 3d.4.2 | Property taxes | - | - | - | - | - | - | 53 | 5 | 58 | 58 | - | - | - | - | - | - | - | - | - | - | - |
| 3d.4.4 | NRC ISFSI Fees | - | - | - | - | - | - | 4 | 0 | 4 | - | 4 | - | - | - | - | - | - | - | - | - | - |
| 3d.4.5 | Emergency Planning Fees | - | - | - | - | - | - | 3 | 0 | 3 | - | 3 | - | - | - | - | - | - | - | - | - | - |
| 3d.4.6 | Fixed Overhead | - | - | - | - | - | - | 6 | 1 | 7 | - | 7 | - | - | - | - | - | - | - | - | - | - |
| 3d.4.7 | Railroad Track Maintenance | - | - | - | - | - | - | 2 | 0 | 3 | - | 3 | - | - | - | - | - | - | - | - | - | - |
| 3d.4.8 | Security Staff Cost | - | - | - | - | - | - | 83 | 13 | 96 | - | 96 | - | - | - | - | - | - | - | - | - | 1,037 |
| 3d.4.9 | Utility Staff Cost | - | - | - | - | - | - | 19 | 3 | 22 | - | 22 | - | - | - | - | - | - | - | - | - | 269 |
| 3d.4 | Subtotal Period 3d Period-Dependent Costs | - | - | - | - | - | - | 181 | 24 | 204 | 197 | 7 | - | - | - | - | - | - | - | - | - | 1,306 |
| 3d.0 | TOTAL PERIOD 3d COST | - | - | 1,444 | - | - | - | 8,680 | 1,687 | 12,039 | 11,984 | 55 | - | - | - | - | - | 1,773 | 344,823 | - | - | 1,306 |
| PERIOD 3e - ISFSI Decontamination | | | | | | | | | | | | | | | | | | | | | | |
| Period 3e Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Period 3e Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3e.2.1 | License Termination ISFSI | - | 24 | 81 | 435 | - | - | 2,532 | 978 | 4,890 | 4,890 | - | - | - | 9,355 | - | - | - | 1,123,457 | 3,762 | 1,065 | - |
| 3e.2 | Subtotal Period 3e Additional Costs | - | 24 | 81 | 435 | - | - | 2,532 | 978 | 4,890 | 4,890 | - | - | - | 9,355 | - | - | - | 1,123,457 | 3,762 | 1,065 | - |
| Period 3e Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3e.4.1 | Insurance | - | - | - | - | - | - | 93 | 23 | 116 | 116 | - | - | - | - | - | - | - | - | - | - | - |
| 3e.4.2 | Property taxes | - | - | - | - | - | - | 56 | 14 | 69 | 69 | - | - | - | - | - | - | - | - | - | - | - |
| 3e.4.3 | Plant energy budget | - | - | - | - | - | - | 11 | 3 | 13 | 13 | - | - | - | - | - | - | - | - | - | - | - |
| 3e.4.4 | Fixed Overhead | - | - | - | - | - | - | 54 | 14 | 68 | 68 | - | - | - | - | - | - | - | - | - | - | - |
| 3e.4.5 | Railroad Track Maintenance | - | - | - | - | - | - | 21 | 5 | 26 | 26 | - | - | - | - | - | - | - | - | - | - | - |
| 3e.4.6 | Security Staff Cost | - | - | - | - | - | - | 174 | 43 | 217 | 217 | - | - | - | - | - | - | - | - | - | - | 2,500 |
| 3e.4.7 | Utility Staff Cost | - | - | - | - | - | - | 129 | 32 | 161 | 161 | - | - | - | - | - | - | - | - | - | - | 1,896 |
| 3e.4 | Subtotal Period 3e Period-Dependent Costs | - | - | - | - | - | - | 536 | 134 | 670 | 670 | - | - | - | - | - | - | - | - | - | - | 4,396 |
| 3e.0 | TOTAL PERIOD 3e COST | - | 24 | 81 | 435 | - | - | 2,532 | 1,112 | 5,560 | 5,560 | - | - | - | 9,355 | - | - | - | 1,123,457 | 3,762 | 5,460 | - |

**Prairie Island Nuclear Generating Plant
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**Table C-2
Prairie Island DECON Unit 2
DECON Decommissioning Cost Estimate with DOE Pickup of Industry Spent Fuel Starting in 2035
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|-------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| PERIOD 3f - ISFSI Site Restoration | | | | | | | | | | | | | | | | | | | | | | |
| Period 3f Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Period 3f Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3f.2.1 | Demolition and Site Restoration of ISFSI | - | 515 | - | - | - | - | 68 | 87 | 670 | - | - | 670 | - | - | - | - | - | - | - | 2,219 | 80 |
| 3f.2 | Subtotal Period 3f Additional Costs | - | 515 | - | - | - | - | 68 | 87 | 670 | - | - | 670 | - | - | - | - | - | - | - | 2,219 | 80 |
| Period 3f Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3f.3.1 | Small tool allowance | - | 3 | - | - | - | - | - | 0 | 4 | - | - | 4 | - | - | - | - | - | - | - | - | - |
| 3f.3 | Subtotal Period 3f Collateral Costs | - | 3 | - | - | - | - | - | 0 | 4 | - | - | 4 | - | - | - | - | - | - | - | - | - |
| Period 3f Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3f.4.2 | Property taxes | - | - | - | - | - | - | 28 | 3 | 31 | - | - | 31 | - | - | - | - | - | - | - | - | - |
| 3f.4.3 | Heavy equipment rental | - | 59 | - | - | - | - | - | 9 | 68 | - | - | 68 | - | - | - | - | - | - | - | - | - |
| 3f.4.4 | Plant energy budget | - | - | - | - | - | - | 6 | 1 | 6 | - | - | 6 | - | - | - | - | - | - | - | - | - |
| 3f.4.5 | Fixed Overhead | - | - | - | - | - | - | 28 | 4 | 32 | - | - | 32 | - | - | - | - | - | - | - | - | - |
| 3f.4.6 | Railroad Track Maintenance | - | - | - | - | - | - | 11 | 2 | 12 | - | - | 12 | - | - | - | - | - | - | - | - | - |
| 3f.4.7 | Security Staff Cost | - | - | - | - | - | - | 89 | 13 | 102 | - | - | 102 | - | - | - | - | - | - | - | - | 1,281 |
| 3f.4.8 | Utility Staff Cost | - | - | - | - | - | - | 55 | 8 | 63 | - | - | 63 | - | - | - | - | - | - | - | - | 795 |
| 3f.4 | Subtotal Period 3f Period-Dependent Costs | - | 59 | - | - | - | - | 216 | 40 | 315 | - | - | 315 | - | - | - | - | - | - | - | - | 2,076 |
| 3f.0 | TOTAL PERIOD 3f COST | - | 577 | - | - | - | - | 284 | 128 | 989 | - | - | 989 | - | - | - | - | - | - | - | 2,219 | 2,156 |
| PERIOD 3 TOTALS | | - | 39,847 | 1,525 | 435 | - | 11,212 | 246,565 | 35,750 | 335,334 | 18,757 | 250,896 | 65,681 | - | 9,355 | - | - | 1,773 | 1,468,280 | 172,370 | 1,365,615 | |
| TOTAL COST TO DECOMMISSION | | 13,876 | 116,246 | 23,184 | 8,596 | 26,793 | 61,273 | 614,850 | 144,013 | 1,008,829 | 590,962 | 345,097 | 72,770 | 169,384 | 184,110 | 826 | 673 | 1,773 | 17,056,350 | 976,284 | 4,044,049 | |

| | | |
|--|--------------------|----------------------------------|
| TOTAL COST TO DECOMMISSION WITH 16.65% CONTINGENCY: | \$1,008,829 | thousands of 2020 dollars |
| TOTAL NRC LICENSE TERMINATION COST IS 58.58% OR: | \$590,962 | thousands of 2020 dollars |
| SPENT FUEL MANAGEMENT COST IS 34.21% OR: | \$345,097 | thousands of 2020 dollars |
| NON-NUCLEAR DEMOLITION COST IS 7.21% OR: | \$72,770 | thousands of 2020 dollars |
| TOTAL LOW-LEVEL RADIOACTIVE WASTE VOLUME BURIED (EXCLUDING GTCC): | 185,608 | Cubic Feet |
| TOTAL GREATER THAN CLASS C RADWASTE VOLUME GENERATED: | 1,773 | Cubic Feet |
| TOTAL SCRAP METAL REMOVED: | 42,328 | Tons |
| TOTAL CRAFT LABOR REQUIREMENTS: | 976,284 | Man-hours |

End Notes:
n/a - indicates that this activity not charged as decommissioning expense
a - indicates that this activity performed by decommissioning staff
0 - indicates that this value is less than 0.5 but is non-zero
A cell containing " - " indicates a zero value

***Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis***

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APPENDIX D

DETAILED COST ANALYSIS

SCENARIO 2: DECON with 60 Year DFS

| | <u>Page</u> |
|---|-------------|
| Prairie Island Nuclear Generating Plant, Unit 1 | D-2 |
| Prairie Island Nuclear Generating Plant, Unit 2 | D-12 |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table D-1
Prairie Island DECON Unit 1
DECON Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|--|--|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| PERIOD 1a - Shutdown through Transition | | | | | | | | | | | | | | | | | | | | | |
| Period 1a Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| 1a.1.1 | Prepare preliminary decommissioning cost | - | - | - | - | - | - | 167 | 25 | 192 | 192 | - | - | - | - | - | - | - | - | - | 1,300 |
| 1a.1.2 | Notification of Cessation of Operations | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.3 | Remove fuel & source material | - | - | - | - | - | - | - | - | n/a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.4 | Notification of Permanent Defueling | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.5 | Deactivate plant systems & process waste | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.6 | Prepare and submit PSDAR | - | - | - | - | - | - | 257 | 39 | 296 | 296 | - | - | - | - | - | - | - | - | - | 2,000 |
| 1a.1.7 | Review plant dwgs & specs. | - | - | - | - | - | - | 591 | 89 | 680 | 680 | - | - | - | - | - | - | - | - | - | 4,600 |
| 1a.1.8 | Perform detailed rad survey | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.9 | Estimate by-product inventory | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| 1a.1.10 | End product description | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| 1a.1.11 | Detailed by-product inventory | - | - | - | - | - | - | 167 | 25 | 192 | 192 | - | - | - | - | - | - | - | - | - | 1,300 |
| 1a.1.12 | Define major work sequence | - | - | - | - | - | - | 964 | 145 | 1,108 | 1,108 | - | - | - | - | - | - | - | - | - | 7,500 |
| 1a.1.13 | Perform SER and EA | - | - | - | - | - | - | 398 | 60 | 458 | 458 | - | - | - | - | - | - | - | - | - | 3,100 |
| 1a.1.14 | Prepare/submit Defueled Technical Specifications | - | - | - | - | - | - | 964 | 145 | 1,108 | 1,108 | - | - | - | - | - | - | - | - | - | 7,500 |
| 1a.1.15 | Perform Site-Specific Cost Study | - | - | - | - | - | - | 643 | 96 | 739 | 739 | - | - | - | - | - | - | - | - | - | 5,000 |
| 1a.1.16 | Prepare/submit Irradiated Fuel Management Plan | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| Activity Specifications | | | | | | | | | | | | | | | | | | | | | |
| 1a.1.17.1 | Plant & temporary facilities | - | - | - | - | - | - | 632 | 95 | 727 | 654 | - | 73 | - | - | - | - | - | - | - | 4,920 |
| 1a.1.17.2 | Plant systems | - | - | - | - | - | - | 536 | 80 | 616 | 554 | - | 62 | - | - | - | - | - | - | - | 4,167 |
| 1a.1.17.3 | NSSS Decontamination Flush | - | - | - | - | - | - | 64 | 10 | 74 | 74 | - | - | - | - | - | - | - | - | - | 500 |
| 1a.1.17.4 | Reactor internals | - | - | - | - | - | - | 912 | 137 | 1,049 | 1,049 | - | - | - | - | - | - | - | - | - | 7,100 |
| 1a.1.17.5 | Reactor vessel | - | - | - | - | - | - | 835 | 125 | 961 | 961 | - | - | - | - | - | - | - | - | - | 6,500 |
| 1a.1.17.6 | Biological shield | - | - | - | - | - | - | 64 | 10 | 74 | 74 | - | - | - | - | - | - | - | - | - | 500 |
| 1a.1.17.7 | Steam generators | - | - | - | - | - | - | 401 | 60 | 461 | 461 | - | - | - | - | - | - | - | - | - | 3,120 |
| 1a.1.17.8 | Reinforced concrete | - | - | - | - | - | - | 206 | 31 | 236 | 118 | - | 118 | - | - | - | - | - | - | - | 1,600 |
| 1a.1.17.9 | Main Turbine | - | - | - | - | - | - | 51 | 8 | 59 | - | - | 59 | - | - | - | - | - | - | - | 400 |
| 1a.1.17.10 | Main Condensers | - | - | - | - | - | - | 51 | 8 | 59 | - | - | 59 | - | - | - | - | - | - | - | 400 |
| 1a.1.17.11 | Plant structures & buildings | - | - | - | - | - | - | 401 | 60 | 461 | 231 | - | 231 | - | - | - | - | - | - | - | 3,120 |
| 1a.1.17.12 | Waste management | - | - | - | - | - | - | 591 | 89 | 680 | 680 | - | - | - | - | - | - | - | - | - | 4,600 |
| 1a.1.17.13 | Facility & site closeout | - | - | - | - | - | - | 116 | 17 | 133 | 67 | - | 67 | - | - | - | - | - | - | - | 900 |
| 1a.1.17 | Total | - | - | - | - | - | - | 4,861 | 729 | 5,591 | 4,923 | - | 668 | - | - | - | - | - | - | - | 37,827 |
| Planning & Site Preparations | | | | | | | | | | | | | | | | | | | | | |
| 1a.1.18 | Prepare dismantling sequence | - | - | - | - | - | - | 308 | 46 | 355 | 355 | - | - | - | - | - | - | - | - | - | 2,400 |
| 1a.1.19 | Plant prep. & temp. svces | - | - | - | - | - | - | 3,500 | 525 | 4,025 | 4,025 | - | - | - | - | - | - | - | - | - | - |
| 1a.1.20 | Design water clean-up system | - | - | - | - | - | - | 180 | 27 | 207 | 207 | - | - | - | - | - | - | - | - | - | 1,400 |
| 1a.1.21 | Rigging/Cont. Cntrl Envlps/tooling/etc. | - | - | - | - | - | - | 2,400 | 360 | 2,760 | 2,760 | - | - | - | - | - | - | - | - | - | - |
| 1a.1.22 | Procure casks/liners & containers | - | - | - | - | - | - | 158 | 24 | 182 | 182 | - | - | - | - | - | - | - | - | - | 1,230 |
| 1a.1 | Subtotal Period 1a Activity Costs | - | - | - | - | - | - | 15,945 | 2,392 | 18,336 | 17,669 | - | 668 | - | - | - | - | - | - | - | 78,157 |
| Period 1a Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 1a.2.1 | Spent Fuel Pool Isolation | - | - | - | - | - | - | 12,675 | 1,901 | 14,576 | 14,576 | - | - | - | - | - | - | - | - | - | - |
| 1a.2 | Subtotal Period 1a Additional Costs | - | - | - | - | - | - | 12,675 | 1,901 | 14,576 | 14,576 | - | - | - | - | - | - | - | - | - | - |
| Period 1a Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 1a.3.1 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 1,249 | - | 1,249 | - | 1,249 | - | - | - | - | - | - | - | - | - |
| 1a.3 | Subtotal Period 1a Collateral Costs | - | - | - | - | - | - | 1,249 | - | 1,249 | - | 1,249 | - | - | - | - | - | - | - | - | - |
| Period 1a Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 1a.4.1 | Insurance | - | - | - | - | - | - | 1,660 | 166 | 1,826 | 1,826 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.2 | Property taxes | - | - | - | - | - | - | 3,623 | 362 | 3,985 | 3,985 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.3 | Health physics supplies | - | 614 | - | - | - | - | - | 153 | 767 | 767 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.4 | Heavy equipment rental | - | 753 | - | - | - | - | - | 113 | 866 | 866 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.5 | Disposal of DAW generated | - | - | 12 | 5 | - | 50 | - | 14 | 82 | 82 | - | - | - | 610 | - | - | - | 12,190 | 20 | - |
| 1a.4.6 | Plant energy budget | - | - | - | - | - | - | 1,621 | 243 | 1,864 | 1,864 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.7 | NRC Fees | - | - | - | - | - | - | 1,137 | 114 | 1,251 | 1,251 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.8 | Emergency Planning Fees | - | - | - | - | - | - | 2,174 | 217 | 2,392 | - | 2,392 | - | - | - | - | - | - | - | - | - |
| 1a.4.9 | Fixed Overhead | - | - | - | - | - | - | 1,440 | 216 | 1,656 | 1,656 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.10 | Spent Fuel Pool O&M | - | - | - | - | - | - | 422 | 63 | 486 | - | 486 | - | - | - | - | - | - | - | - | - |
| 1a.4.11 | ISFSI Operating Costs | - | - | - | - | - | - | 56 | 8 | 64 | - | 64 | - | - | - | - | - | - | - | - | - |
| 1a.4.12 | Railroad Track Maintenance | - | - | - | - | - | - | 63 | 9 | 72 | 72 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.13 | Security Staff Cost | - | - | - | - | - | - | 8,328 | 1,249 | 9,577 | 9,577 | - | - | - | - | - | - | - | - | - | 122,720 |
| 1a.4.14 | Utility Staff Cost | - | - | - | - | - | - | 26,931 | 4,040 | 30,971 | 30,971 | - | - | - | - | - | - | - | - | - | 422,240 |
| 1a.4 | Subtotal Period 1a Period-Dependent Costs | - | 1,367 | 12 | 5 | - | 50 | 47,456 | 6,970 | 55,860 | 52,918 | 2,942 | - | - | 610 | - | - | - | 12,190 | 20 | 544,960 |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table D-1
Prairie Island DECON Unit 1
DECON Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|--|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| 1a.0 | TOTAL PERIOD 1a COST | - | 1,367 | 12 | 5 | - | 50 | 77,325 | 11,263 | 90,022 | 85,163 | 4,191 | 668 | - | 610 | - | - | - | 12,190 | 20 | 623,117 |
| PERIOD 1b - Decommissioning Preparations | | | | | | | | | | | | | | | | | | | | | |
| Period 1b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| Detailed Work Procedures | | | | | | | | | | | | | | | | | | | | | |
| 1b.1.1.1 | Plant systems | - | - | - | - | - | - | 608 | 91 | 700 | 630 | - | 70 | - | - | - | - | - | - | - | 4,733 |
| 1b.1.1.2 | NSSS Decontamination Flush | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| 1b.1.1.3 | Reactor internals | - | - | - | - | - | - | 321 | 48 | 369 | 369 | - | - | - | - | - | - | - | - | - | 2,500 |
| 1b.1.1.4 | Remaining buildings | - | - | - | - | - | - | 174 | 26 | 200 | 50 | - | 150 | - | - | - | - | - | - | - | 1,350 |
| 1b.1.1.5 | CRD cooling assembly | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| 1b.1.1.6 | CRD housings & ICI tubes | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| 1b.1.1.7 | Incore instrumentation | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| 1b.1.1.8 | Reactor vessel | - | - | - | - | - | - | 467 | 70 | 537 | 537 | - | - | - | - | - | - | - | - | - | 3,630 |
| 1b.1.1.9 | Facility closeout | - | - | - | - | - | - | 154 | 23 | 177 | 89 | - | 89 | - | - | - | - | - | - | - | 1,200 |
| 1b.1.1.10 | Missile shields | - | - | - | - | - | - | 58 | 9 | 67 | 67 | - | - | - | - | - | - | - | - | - | 450 |
| 1b.1.1.11 | Biological shield | - | - | - | - | - | - | 154 | 23 | 177 | 177 | - | - | - | - | - | - | - | - | - | 1,200 |
| 1b.1.1.12 | Steam generators | - | - | - | - | - | - | 591 | 89 | 680 | 680 | - | - | - | - | - | - | - | - | - | 4,600 |
| 1b.1.1.13 | Reinforced concrete | - | - | - | - | - | - | 129 | 19 | 148 | 74 | - | 74 | - | - | - | - | - | - | - | 1,000 |
| 1b.1.1.14 | Main Turbine | - | - | - | - | - | - | 200 | 30 | 231 | - | - | 231 | - | - | - | - | - | - | - | 1,560 |
| 1b.1.1.15 | Main Condensers | - | - | - | - | - | - | 200 | 30 | 231 | - | - | 231 | - | - | - | - | - | - | - | 1,560 |
| 1b.1.1.16 | Auxiliary building | - | - | - | - | - | - | 351 | 53 | 403 | 363 | - | 40 | - | - | - | - | - | - | - | 2,730 |
| 1b.1.1.17 | Reactor building | - | - | - | - | - | - | 351 | 53 | 403 | 363 | - | 40 | - | - | - | - | - | - | - | 2,730 |
| 1b.1.1 | Total | - | - | - | - | - | - | 4,272 | 641 | 4,913 | 3,989 | - | 924 | - | - | - | - | - | - | - | 33,243 |
| 1b.1.2 | Decon primary loop | 572 | - | - | - | - | - | - | 286 | 859 | 859 | - | - | - | - | - | - | - | - | - | 1,067 |
| 1b.1 | Subtotal Period 1b Activity Costs | 572 | - | - | - | - | - | 4,272 | 927 | 5,772 | 4,848 | - | 924 | - | - | - | - | - | - | - | 33,243 |
| Period 1b Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 1b.2.1 | Site Characterization | - | - | - | - | - | - | 3,520 | 1,056 | 4,576 | 4,576 | - | - | - | - | - | - | - | - | - | 21,020 |
| 1b.2.2 | Mixed/Hazardous Waste | - | - | 353 | 94 | 178 | - | - | 76 | 702 | 702 | - | - | 6,132 | - | - | - | - | - | 351,977 | 2,348 |
| 1b.2.3 | Asbestos Abatement | - | 2,526 | 3 | 150 | - | 1,369 | - | 996 | 5,044 | 5,044 | - | - | - | 12,843 | - | - | - | - | 166,959 | 20,907 |
| 1b.2 | Subtotal Period 1b Additional Costs | - | 2,526 | 356 | 244 | 178 | 1,369 | 3,520 | 2,129 | 10,321 | 10,321 | - | - | 6,132 | 12,843 | - | - | - | - | 518,936 | 44,275 |
| Period 1b Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 1b.3.1 | Decon equipment | 1,055 | - | - | - | - | - | - | 158 | 1,213 | 1,213 | - | - | - | - | - | - | - | - | - | - |
| 1b.3.2 | DOC staff relocation expenses | - | - | - | - | - | - | 1,264 | 190 | 1,454 | 1,454 | - | - | - | - | - | - | - | - | - | - |
| 1b.3.3 | Process decommissioning water waste | 25 | - | 16 | 29 | - | 66 | - | 35 | 172 | 172 | - | - | 152 | - | - | - | - | - | 9,127 | 30 |
| 1b.3.4 | Process decommissioning chemical flush waste | 2 | - | 61 | 199 | - | 3,889 | - | 1,009 | 5,159 | 5,159 | - | - | - | - | 588 | - | - | - | 62,689 | 110 |
| 1b.3.5 | Small tool allowance | - | 36 | - | - | - | - | - | 5 | 42 | 42 | - | - | - | - | - | - | - | - | - | - |
| 1b.3.6 | Pipe cutting equipment | - | 1,200 | - | - | - | - | - | 180 | 1,380 | 1,380 | - | - | - | - | - | - | - | - | - | - |
| 1b.3.7 | Decon rig | 2,104 | - | - | - | - | - | - | 316 | 2,419 | 2,419 | - | - | - | - | - | - | - | - | - | - |
| 1b.3.8 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 163 | 25 | 188 | - | 188 | - | - | - | - | - | - | - | - | - |
| 1b.3.9 | Retention and Severance | - | - | - | - | - | - | 1,032 | 155 | 1,187 | 1,187 | - | - | - | - | - | - | - | - | - | - |
| 1b.3.10 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 623 | - | 623 | - | 623 | - | - | - | - | - | - | - | - | - |
| 1b.3 | Subtotal Period 1b Collateral Costs | 3,185 | 1,236 | 77 | 228 | - | 3,955 | 3,082 | 2,072 | 13,836 | 13,025 | 811 | - | 152 | 588 | - | - | - | - | 71,815 | 140 |
| Period 1b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 1b.4.1 | Decon supplies | 38 | - | - | - | - | - | - | 9 | 47 | 47 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.2 | Insurance | - | - | - | - | - | - | 828 | 83 | 910 | 910 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.3 | Property taxes | - | - | - | - | - | - | 1,806 | 181 | 1,987 | 1,987 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.4 | Health physics supplies | - | 475 | - | - | - | - | - | 119 | 594 | 594 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.5 | Heavy equipment rental | - | 375 | - | - | - | - | - | 56 | 432 | 432 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.6 | Disposal of DAW generated | - | - | 7 | 3 | - | 29 | - | 8 | 48 | 48 | - | - | 356 | - | - | - | - | - | 7,122 | 12 |
| 1b.4.7 | Plant energy budget | - | - | - | - | - | - | 1,617 | 243 | 1,859 | 1,859 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.8 | NRC Fees | - | - | - | - | - | - | 323 | 32 | 355 | 355 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.9 | Emergency Planning Fees | - | - | - | - | - | - | 1,084 | 108 | 1,193 | - | 1,193 | - | - | - | - | - | - | - | - | - |
| 1b.4.10 | Fixed Overhead | - | - | - | - | - | - | 718 | 108 | 826 | 826 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.11 | Spent Fuel Pool O&M | - | - | - | - | - | - | 211 | 32 | 242 | - | 242 | - | - | - | - | - | - | - | - | - |
| 1b.4.12 | ISFSI Operating Costs | - | - | - | - | - | - | 28 | 4 | 32 | - | 32 | - | - | - | - | - | - | - | - | - |
| 1b.4.13 | Railroad Track Maintenance | - | - | - | - | - | - | 31 | 5 | 36 | 36 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.14 | Security Staff Cost | - | - | - | - | - | - | 4,153 | 623 | 4,775 | 4,775 | - | - | - | - | - | - | - | - | - | 61,192 |
| 1b.4.15 | DOC Staff Cost | - | - | - | - | - | - | 5,846 | 877 | 6,723 | 6,723 | - | - | - | - | - | - | - | - | - | 63,266 |
| 1b.4.16 | Utility Staff Cost | - | - | - | - | - | - | 13,505 | 2,026 | 15,531 | 15,531 | - | - | - | - | - | - | - | - | - | 211,579 |
| 1b.4 | Subtotal Period 1b Period-Dependent Costs | 38 | 851 | 7 | 3 | - | 29 | 30,149 | 4,513 | 35,590 | 34,123 | 1,467 | - | 356 | - | - | - | - | - | 7,122 | 12 |
| 1b.0 | TOTAL PERIOD 1b COST | 3,795 | 4,613 | 440 | 475 | 178 | 5,354 | 41,023 | 9,641 | 65,519 | 62,317 | 2,278 | 924 | 6,132 | 13,351 | 588 | - | - | - | 597,873 | 45,493 |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table D-1
Prairie Island DECON Unit 1
DECON Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|--|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| PERIOD 1 TOTALS | | 3,795 | 5,980 | 452 | 480 | 178 | 5,404 | 118,348 | 20,903 | 155,540 | 147,480 | 6,468 | 1,592 | 6,132 | 13,961 | 588 | - | - | 610,063 | 45,513 | 1,000,729 |
| PERIOD 2a - Large Component Removal | | | | | | | | | | | | | | | | | | | | | |
| Period 2a Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| Nuclear Steam Supply System Removal | | | | | | | | | | | | | | | | | | | | | |
| 2a.1.1.1 | Reactor Coolant Piping | 54 | 47 | 10 | 18 | - | 187 | - | 89 | 406 | 406 | - | - | - | 508 | - | - | - | 35,411 | 1,421 | - |
| 2a.1.1.2 | Pressurizer Relief Tank | 24 | 21 | 6 | 12 | - | 125 | - | 51 | 238 | 238 | - | - | - | 338 | - | - | - | 23,594 | 630 | - |
| 2a.1.1.3 | Reactor Coolant Pumps & Motors | 57 | 68 | 110 | 93 | - | 463 | - | 186 | 977 | 977 | - | - | - | 2,332 | - | - | - | 295,800 | 2,049 | 100 |
| 2a.1.1.4 | Pressurizer | - | 77 | 503 | 97 | - | 776 | - | 278 | 1,732 | 1,732 | - | - | - | 2,196 | - | - | - | 185,015 | 1,666 | 938 |
| 2a.1.1.5 | Steam Generators | - | 3,307 | 2,269 | 1,770 | 2,409 | 4,001 | - | 2,681 | 16,437 | 16,437 | - | - | 18,672 | 11,316 | - | - | - | 1,689,435 | 11,613 | 2,875 |
| 2a.1.1.6 | CRDMs/ICIs/Service Structure Removal | 302 | 281 | 218 | 66 | - | 938 | - | 488 | 2,294 | 2,294 | - | - | - | 4,797 | - | - | - | 177,400 | 8,104 | - |
| 2a.1.1.7 | Reactor Vessel Internals | 82 | 4,861 | 13,621 | 929 | - | 9,015 | 307 | 11,878 | 40,693 | 40,693 | - | - | - | 501 | 125 | 673 | - | 164,987 | 25,123 | 1,163 |
| 2a.1.1.8 | Reactor Vessel | 94 | 6,046 | 2,028 | 728 | - | 2,975 | 307 | 6,804 | 18,982 | 18,982 | - | - | - | 8,073 | - | - | - | 576,524 | 25,123 | 1,163 |
| 2a.1.1 | Totals | 613 | 14,709 | 18,764 | 3,714 | 2,409 | 18,480 | 614 | 22,455 | 81,759 | 81,759 | - | - | 18,672 | 30,062 | 125 | 673 | - | 3,148,166 | 75,729 | 6,240 |
| Removal of Major Equipment | | | | | | | | | | | | | | | | | | | | | |
| 2a.1.2 | Main Turbine/Generator | - | 331 | 172 | 64 | 527 | 377 | - | 283 | 1,752 | 1,752 | - | - | 2,131 | 1,187 | - | - | - | 203,265 | 4,667 | - |
| 2a.1.3 | Main Condensers | - | 2,801 | 109 | 62 | 705 | 533 | - | 960 | 5,170 | 5,170 | - | - | 3,800 | 1,587 | - | - | - | 271,824 | 39,151 | - |
| Cascading Costs from Clean Building Demolition | | | | | | | | | | | | | | | | | | | | | |
| 2a.1.4.1 | Reactor | - | 794 | - | - | - | - | - | 119 | 913 | 913 | - | - | - | - | - | - | - | - | 7,589 | - |
| 2a.1.4 | Totals | - | 794 | - | - | - | - | - | 119 | 913 | 913 | - | - | - | - | - | - | - | - | 7,589 | - |
| Disposal of Plant Systems | | | | | | | | | | | | | | | | | | | | | |
| 2a.1.5.1 | Air Removal | - | 31 | - | - | - | - | - | 5 | 36 | - | - | 36 | - | - | - | - | - | - | 452 | - |
| 2a.1.5.2 | Auxiliary Feedwater | - | 46 | - | - | - | - | - | 7 | 53 | - | - | 53 | - | - | - | - | - | - | 670 | - |
| 2a.1.5.3 | Auxiliary Feedwater - RCA | - | 47 | 0 | 2 | 36 | - | - | 17 | 102 | 102 | - | - | 215 | - | - | - | - | 8,722 | 601 | - |
| 2a.1.5.4 | Bleed Steam | - | 90 | - | - | - | - | - | 14 | 104 | - | - | 104 | - | - | - | - | - | - | 1,335 | - |
| 2a.1.5.5 | Caustic Addition - RCA | - | 38 | 0 | 2 | 39 | - | - | 16 | 95 | 95 | - | - | 233 | - | - | - | - | 9,453 | 444 | - |
| 2a.1.5.6 | Chemical Feed | - | 20 | - | - | - | - | - | 3 | 23 | - | - | 23 | - | - | - | - | - | - | 304 | - |
| 2a.1.5.7 | Chemical Feed - RCA | - | 1 | 0 | 0 | 1 | - | - | 0 | 3 | 3 | - | - | 6 | - | - | - | - | 243 | 12 | - |
| 2a.1.5.8 | Circulating Water | - | 42 | - | - | - | - | - | 6 | 49 | - | - | 49 | - | - | - | - | - | - | 619 | - |
| 2a.1.5.9 | Condensate | - | 474 | - | - | - | - | - | 71 | 545 | - | - | 545 | - | - | - | - | - | - | 6,837 | - |
| 2a.1.5.10 | Condensate Polishing | - | 235 | - | - | - | - | - | 35 | 271 | - | - | 271 | - | - | - | - | - | - | 3,420 | - |
| 2a.1.5.11 | Condensate Polishing - RCA | - | 183 | 4 | 15 | 348 | - | - | 101 | 651 | 651 | - | - | 2,078 | - | - | - | - | 84,395 | 2,329 | - |
| 2a.1.5.12 | Electro-hydraulic | - | 9 | - | - | - | - | - | 1 | 10 | - | - | 10 | - | - | - | - | - | - | 127 | - |
| 2a.1.5.13 | Feedwater | - | 153 | - | - | - | - | - | 23 | 175 | - | - | 175 | - | - | - | - | - | - | 2,215 | - |
| 2a.1.5.14 | Feedwater - RCA | - | 195 | 7 | 24 | 537 | - | - | 133 | 895 | 895 | - | - | 3,208 | - | - | - | - | 130,294 | 2,651 | - |
| 2a.1.5.15 | Gland Seal | - | 34 | - | - | - | - | - | 5 | 39 | - | - | 39 | - | - | - | - | - | - | 505 | - |
| 2a.1.5.16 | Heater Drain | - | 400 | - | - | - | - | - | 60 | 460 | - | - | 460 | - | - | - | - | - | - | 5,881 | - |
| 2a.1.5.17 | Internal Circ Water & CDSR | - | 27 | - | - | - | - | - | 4 | 31 | - | - | 31 | - | - | - | - | - | - | 389 | - |
| 2a.1.5.18 | Main Gen/Exciter/Transformer | - | 0 | - | - | - | - | - | 0 | 0 | - | - | 0 | - | - | - | - | - | - | 5 | - |
| 2a.1.5.19 | Main Steam | - | 115 | - | - | - | - | - | 17 | 133 | - | - | 133 | - | - | - | - | - | - | 1,690 | - |
| 2a.1.5.20 | Main Steam - RCA | - | 366 | 10 | 37 | 844 | - | - | 225 | 1,482 | 1,482 | - | - | 5,044 | - | - | - | - | 204,825 | 4,956 | - |
| 2a.1.5.21 | Steam Generator Blowdown | - | 478 | 22 | 29 | 340 | 234 | - | 235 | 1,337 | 1,337 | - | - | 2,031 | 686 | - | - | - | 126,640 | 6,667 | - |
| 2a.1.5.22 | Steam Generators | - | 5 | - | - | - | - | - | 1 | 6 | - | - | 6 | - | - | - | - | - | - | 75 | - |
| 2a.1.5.23 | Turbine & Moisture Separators | - | 386 | - | - | - | - | - | 58 | 444 | - | - | 444 | - | - | - | - | - | - | 5,609 | - |
| 2a.1.5.24 | Turbine Oil Purification | - | 70 | - | - | - | - | - | 11 | 81 | - | - | 81 | - | - | - | - | - | - | 1,003 | - |
| 2a.1.5 | Totals | - | 3,445 | 44 | 108 | 2,144 | 234 | - | 1,048 | 7,023 | 4,565 | - | 2,458 | 12,815 | 686 | - | - | - | 564,572 | 48,794 | - |
| 2a.1.6 | Scaffolding in support of decommissioning | - | 930 | 3 | 1 | 26 | 4 | - | 238 | 1,202 | 1,202 | - | - | 138 | 12 | - | - | - | 6,985 | 6,368 | - |
| 2a.1 | Subtotal Period 2a Activity Costs | 613 | 23,011 | 19,092 | 3,950 | 5,810 | 19,628 | 614 | 25,102 | 97,819 | 95,362 | - | 2,458 | 37,556 | 33,533 | 125 | 673 | - | 4,194,811 | 182,298 | 6,240 |
| Period 2a Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 2a.2.1 | Retired RPV Upper Internals Package | - | 257 | 387 | 217 | - | 1,394 | - | 1,041 | 3,296 | 3,296 | - | - | - | 376 | 112 | - | - | 50,164 | 3,333 | 133 |
| 2a.2 | Subtotal Period 2a Additional Costs | - | 257 | 387 | 217 | - | 1,394 | - | 1,041 | 3,296 | 3,296 | - | - | - | 376 | 112 | - | - | 50,164 | 3,333 | 133 |
| Period 2a Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 2a.3.1 | Process decommissioning water waste | 48 | - | 32 | 58 | - | 130 | - | 68 | 337 | 337 | - | - | - | 299 | - | - | - | 17,968 | 58 | - |
| 2a.3.2 | Process decommissioning chemical flush waste | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 2a.3.3 | Small tool allowance | - | 239 | - | - | - | - | - | 36 | 274 | 247 | - | 27 | - | - | - | - | - | - | - | - |
| 2a.3.4 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 1,639 | 246 | 1,885 | - | 1,885 | - | - | - | - | - | - | - | - | - |
| 2a.3.5 | Retention and Severance | - | - | - | - | - | - | 12,780 | 1,917 | 14,697 | 14,697 | - | - | - | - | - | - | - | - | - | - |
| 2a.3.6 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 1,780 | - | 1,780 | - | 1,780 | - | - | - | - | - | - | - | - | - |
| 2a.3.7 | On-site survey and release of 0.0 tons clean metallic waste | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table D-1
Prairie Island DECON Unit 1
DECON Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| 2a.3 | Subtotal Period 2a Collateral Costs | 48 | 239 | 32 | 58 | - | 130 | 16,198 | 2,267 | 18,972 | 15,281 | 3,664 | 27 | - | 299 | - | - | - | 17,968 | 58 | - |
| Period 2a Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 2a.4.1 | Decon supplies | 107 | - | - | - | - | - | - | 27 | 134 | 134 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.2 | Insurance | - | - | - | - | - | - | 690 | 69 | 759 | 759 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.3 | Property taxes | - | - | - | - | - | - | 5,009 | 501 | 5,510 | 5,510 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.4 | Health physics supplies | - | 1,950 | - | - | - | - | - | 487 | 2,437 | 2,437 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.5 | Heavy equipment rental | - | 3,565 | - | - | - | - | - | 535 | 4,100 | 4,100 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.6 | Disposal of DAW generated | - | - | 73 | 30 | - | 303 | - | 88 | 493 | 493 | - | - | - | 3,681 | - | - | - | 73,619 | 120 | - |
| 2a.4.7 | Plant energy budget | - | - | - | - | - | - | 2,194 | 329 | 2,523 | 2,523 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.8 | NRC Fees | - | - | - | - | - | - | 842 | 84 | 926 | 926 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.9 | Emergency Planning Fees | - | - | - | - | - | - | 2,647 | 265 | 2,912 | - | 2,912 | - | - | - | - | - | - | - | - | - |
| 2a.4.10 | Fixed Overhead | - | - | - | - | - | - | 1,695 | 254 | 1,949 | 1,949 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.11 | Spent Fuel Pool O&M | - | - | - | - | - | - | 602 | 90 | 692 | - | 692 | - | - | - | - | - | - | - | - | - |
| 2a.4.12 | ISFSI Operating Costs | - | - | - | - | - | - | 80 | 12 | 92 | - | 92 | - | - | - | - | - | - | - | - | - |
| 2a.4.13 | Railroad Track Maintenance | - | - | - | - | - | - | 318 | 48 | 366 | 366 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.14 | Remedial Actions Surveys | - | - | - | - | - | - | 1,596 | 239 | 1,835 | 1,835 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.15 | Security Staff Cost | - | - | - | - | - | - | 11,727 | 1,759 | 13,486 | 13,486 | - | - | - | - | - | - | - | - | - | 172,726 |
| 2a.4.16 | DOC Staff Cost | - | - | - | - | - | - | 20,663 | 3,099 | 23,763 | 23,763 | - | - | - | - | - | - | - | - | - | 225,210 |
| 2a.4.17 | Utility Staff Cost | - | - | - | - | - | - | 26,905 | 4,036 | 30,941 | 30,941 | - | - | - | - | - | - | - | - | - | 417,453 |
| 2a.4 | Subtotal Period 2a Period-Dependent Costs | 107 | 5,515 | 73 | 30 | - | 303 | 74,968 | 11,922 | 92,918 | 89,223 | 3,696 | - | - | 3,681 | - | - | - | 73,619 | 120 | 815,389 |
| 2a.0 | TOTAL PERIOD 2a COST | 768 | 29,021 | 19,584 | 4,254 | 5,810 | 21,456 | 91,780 | 40,333 | 213,006 | 203,161 | 7,360 | 2,485 | 37,556 | 37,889 | 237 | 673 | - | 4,336,562 | 185,810 | 821,762 |
| PERIOD 2b - Site Decontamination | | | | | | | | | | | | | | | | | | | | | |
| Period 2b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| Disposal of Plant Systems | | | | | | | | | | | | | | | | | | | | | |
| 2b.1.1.1 | Aux Bldg Normal Ventilation | - | 2 | 0 | 0 | 1 | - | - | 1 | 3 | 3 | - | - | 3 | - | - | - | - | 140 | 29 | - |
| 2b.1.1.2 | Battery Rm Special Ventilation | - | 0 | - | - | - | - | - | 0 | 0 | - | - | 0 | - | - | - | - | - | - | 6 | - |
| 2b.1.1.3 | Buildings Maintenance | - | 5 | - | - | - | - | - | 1 | 5 | - | - | 5 | - | - | - | - | - | - | 65 | - |
| 2b.1.1.4 | Chemical & Volume Control | 1,120 | 1,389 | 89 | 90 | 753 | 973 | - | 1,286 | 5,700 | 5,700 | - | - | 4,498 | 2,846 | - | - | - | 366,565 | 34,533 | - |
| 2b.1.1.5 | Component Cooling - RCA | - | 858 | 25 | 91 | 2,079 | - | - | 543 | 3,597 | 3,597 | - | - | 12,427 | - | - | - | - | 504,675 | 11,242 | - |
| 2b.1.1.6 | Containment Cooling | - | 74 | - | - | - | - | - | 11 | 85 | - | - | 85 | - | - | - | - | - | - | 1,086 | - |
| 2b.1.1.7 | Containment Cooling - RCA | - | 304 | 7 | 25 | 569 | - | - | 166 | 1,070 | 1,070 | - | - | 3,400 | - | - | - | - | 138,090 | 3,971 | - |
| 2b.1.1.8 | Containment Hydrogen Control - RCA | - | 30 | 0 | 1 | 18 | - | - | 10 | 59 | 59 | - | - | 105 | - | - | - | - | 4,278 | 401 | - |
| 2b.1.1.9 | Containment Spray - RCA | - | 93 | 2 | 6 | 145 | - | - | 46 | 293 | 293 | - | - | 868 | - | - | - | - | 35,249 | 1,217 | - |
| 2b.1.1.10 | Containment Ventilation | - | 255 | 24 | 51 | 828 | 248 | - | 260 | 1,667 | 1,667 | - | - | 4,951 | 737 | - | - | - | 247,952 | 3,668 | - |
| 2b.1.1.11 | Cooling Water | - | 163 | - | - | - | - | - | 24 | 187 | - | - | 187 | - | - | - | - | - | - | 2,396 | - |
| 2b.1.1.12 | Cooling Water - RCA | - | 658 | 16 | 57 | 1,293 | - | - | 368 | 2,392 | 2,392 | - | - | 7,728 | - | - | - | - | 313,832 | 8,594 | - |
| 2b.1.1.13 | D1 Emergency Diesel | - | 50 | - | - | - | - | - | 8 | 58 | - | - | 58 | - | - | - | - | - | - | 730 | - |
| 2b.1.1.14 | D2 Emergency Diesel | - | 36 | - | - | - | - | - | 5 | 41 | - | - | 41 | - | - | - | - | - | - | 522 | - |
| 2b.1.1.15 | Diesel Rooms Ventilation | - | 9 | - | - | - | - | - | 1 | 11 | - | - | 11 | - | - | - | - | - | - | 135 | - |
| 2b.1.1.16 | Electrical - Clean | - | 1,905 | - | - | - | - | - | 286 | 2,191 | - | - | 2,191 | - | - | - | - | - | - | 26,981 | - |
| 2b.1.1.17 | Electrical - Contaminated | - | 611 | 7 | 20 | 423 | 32 | - | 228 | 1,321 | 1,321 | - | - | 2,527 | 95 | - | - | - | 108,690 | 8,377 | - |
| 2b.1.1.18 | Electrical - Decontaminated | - | 3,787 | 48 | 173 | 3,940 | - | - | 1,569 | 9,518 | 9,518 | - | - | 23,551 | - | - | - | - | 956,401 | 49,378 | - |
| 2b.1.1.19 | Fuel Handling | - | 121 | 6 | 11 | 152 | 73 | - | 74 | 436 | 436 | - | - | 908 | 218 | - | - | - | 50,723 | 1,784 | - |
| 2b.1.1.20 | Fuel Oil | - | 121 | - | - | - | - | - | 18 | 140 | - | - | 140 | - | - | - | - | - | - | 1,697 | - |
| 2b.1.1.21 | HVAC - Clean | - | 120 | - | - | - | - | - | 18 | 138 | - | - | 138 | - | - | - | - | - | - | 1,891 | - |
| 2b.1.1.22 | HVAC - Contaminated | - | 374 | 9 | 26 | 546 | 41 | - | 190 | 1,186 | 1,186 | - | - | 3,261 | 123 | - | - | - | 140,257 | 5,032 | - |
| 2b.1.1.23 | Incore Instrumentation | 0 | 28 | 1 | 2 | 10 | 19 | - | 14 | 74 | 74 | - | - | 60 | 57 | - | - | - | 6,058 | 425 | - |
| 2b.1.1.24 | Misc Drains & Vents | - | 233 | 15 | 13 | 65 | 176 | - | 115 | 618 | 618 | - | - | 390 | 514 | - | - | - | 49,062 | 3,091 | - |
| 2b.1.1.25 | Reactor Coolant | 153 | 311 | 21 | 18 | 58 | 265 | - | 234 | 1,060 | 1,060 | - | - | 344 | 777 | - | - | - | 64,085 | 6,470 | - |
| 2b.1.1.26 | Reactor Hot Sampling | 149 | 136 | 12 | 7 | 11 | 118 | - | 142 | 576 | 576 | - | - | 66 | 342 | - | - | - | 25,063 | 3,946 | - |
| 2b.1.1.27 | Reactor Makeup | - | 73 | - | - | - | - | - | 11 | 84 | - | - | 84 | - | - | - | - | - | - | 1,042 | - |
| 2b.1.1.28 | Reactor Vessel | 9 | 21 | 1 | 0 | 4 | 5 | - | 12 | 52 | 52 | - | - | 26 | 14 | - | - | - | 2,000 | 425 | - |
| 2b.1.1.29 | Residual Heat Removal | 357 | 419 | 85 | 86 | 484 | 1,105 | - | 654 | 3,190 | 3,190 | - | - | 2,895 | 3,252 | - | - | - | 326,425 | 7,621 | - |
| 2b.1.1.30 | Safeguards Chilled Water | - | 18 | - | - | - | - | - | 3 | 20 | - | - | 20 | - | - | - | - | - | - | 259 | - |
| 2b.1.1.31 | Safety Injection | - | 893 | 42 | 73 | 1,136 | 393 | - | 507 | 3,044 | 3,044 | - | - | 6,788 | 1,156 | - | - | - | 349,908 | 12,561 | - |
| 2b.1.1.32 | Sampling | - | 60 | 4 | 3 | 10 | 37 | - | 26 | 140 | 140 | - | - | 59 | 107 | - | - | - | 9,420 | 811 | - |
| 2b.1.1.33 | Shield Bldg Ventilation | - | 140 | 14 | 26 | 360 | 165 | - | 135 | 839 | 839 | - | - | 2,152 | 491 | - | - | - | 118,583 | 2,030 | - |
| 2b.1.1.34 | Station & Instrument Air | - | 20 | - | - | - | - | - | 3 | 23 | - | - | 23 | - | - | - | - | - | - | 300 | - |
| 2b.1.1.35 | Station & Instrument Air - RCA | - | 81 | 1 | 2 | 56 | - | - | 29 | 169 | 169 | - | - | 332 | - | - | - | - | 13,496 | 1,053 | - |
| 2b.1.1.36 | Turbine Bldg Traps & Drains | - | 50 | - | - | - | - | - | 8 | 58 | - | - | 58 | - | - | - | - | - | - | 767 | - |
| 2b.1.1.37 | Unit Coolers | - | 42 | - | - | - | - | - | 6 | 49 | - | - | 49 | - | - | - | - | - | - | 611 | - |
| 2b.1.1.38 | Unit Coolers - RCA | - | 55 | 0 | 2 | 39 | - | - | 20 | 115 | 115 | - | - | 230 | - | - | - | - | 9,348 | 683 | - |
| 2b.1.1 | Totals | 1,789 | 13,544 | 429 | 786 | 12,979 | 3,651 | - | 7,032 | 40,209 | 37,119 | - | 3,091 | 77,571 | 10,728 | - | - | - | 3,840,299 | 205,829 | - |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table D-1
Prairie Island DECON Unit 1
DECON Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|--|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| 2b.1.2 | Scaffolding in support of decommissioning | - | 1,163 | 4 | 2 | 32 | 5 | - | 297 | 1,503 | 1,503 | - | - | 173 | 15 | - | - | - | 8,731 | 7,960 | - |
| Decontamination of Site Buildings | | | | | | | | | | | | | | | | | | | | | |
| 2b.1.3.1 | Reactor | 1,215 | 2,807 | 240 | 1,236 | 373 | 13,624 | - | 4,981 | 24,476 | 24,476 | - | - | 2,230 | 83,429 | - | - | - | 3,633,417 | 50,950 | - |
| 2b.1.3.2 | Backwash Waste Receiving Tank | - | 28 | 3 | 17 | - | 97 | - | 34 | 179 | 179 | - | - | - | 929 | - | - | - | 43,896 | 301 | - |
| 2b.1.3 | Totals | 1,215 | 2,835 | 243 | 1,253 | 373 | 13,721 | - | 5,015 | 24,655 | 24,655 | - | - | 2,230 | 84,358 | - | - | - | 3,677,313 | 51,251 | - |
| 2b.1.4 | Prepare/submit License Termination Plan | - | - | - | - | - | - | 526 | 79 | 605 | 605 | - | - | - | - | - | - | - | - | - | 4,096 |
| 2b.1.5 | Receive NRC approval of termination plan | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 2b.1 | Subtotal Period 2b Activity Costs | 3,004 | 17,542 | 675 | 2,041 | 13,384 | 17,377 | 526 | 12,423 | 66,973 | 63,882 | - | 3,091 | 79,974 | 95,101 | - | - | - | 7,526,343 | 265,040 | 4,096 |
| Period 2b Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 2b.2.1 | Operational Equipment | - | - | 11 | 36 | 606 | - | - | 97 | 751 | 751 | - | - | 5,880 | - | - | - | - | 147,000 | 16 | - |
| 2b.2.2 | Excavation of Underground Services | - | 1,175 | - | - | - | - | 225 | 328 | 1,728 | 1,728 | - | - | - | - | - | - | - | - | 7,411 | - |
| 2b.2.3 | Security Modifications | - | - | - | - | - | - | 4,348 | 652 | 5,000 | 5,000 | - | - | - | - | - | - | - | - | - | - |
| 2b.2 | Subtotal Period 2b Additional Costs | - | 1,175 | 11 | 36 | 606 | - | 4,573 | 1,077 | 7,478 | 7,478 | - | - | 5,880 | - | - | - | - | 147,000 | 7,427 | - |
| Period 2b Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 2b.3.1 | Process decommissioning water waste | 108 | - | 74 | 132 | - | 298 | - | 156 | 768 | 768 | - | - | - | 684 | - | - | - | 41,053 | 133 | - |
| 2b.3.2 | Process decommissioning chemical flush waste | 2 | - | 90 | 296 | - | 677 | - | 224 | 1,289 | 1,289 | - | - | - | 875 | - | - | - | 93,252 | 164 | - |
| 2b.3.3 | Small tool allowance | - | 315 | - | - | - | - | - | 47 | 362 | 362 | - | - | - | - | - | - | - | - | - | - |
| 2b.3.4 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 6,924 | 1,039 | 7,963 | - | 7,963 | - | - | - | - | - | - | - | - | - |
| 2b.3.5 | Retention and Severance | - | - | - | - | - | - | 6,141 | 921 | 7,063 | 7,063 | - | - | - | - | - | - | - | - | - | - |
| 2b.3.6 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 1,348 | - | 1,348 | - | 1,348 | - | - | - | - | - | - | - | - | - |
| 2b.3.7 | On-site survey and release of 0.0 tons clean metallic waste | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 2b.3 | Subtotal Period 2b Collateral Costs | 110 | 315 | 164 | 428 | - | 975 | 14,414 | 2,387 | 18,793 | 9,482 | 9,311 | - | - | 1,559 | - | - | - | 134,305 | 297 | - |
| Period 2b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 2b.4.1 | Decon supplies | 511 | - | - | - | - | - | - | 128 | 639 | 639 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.2 | Insurance | - | - | - | - | - | - | 523 | 52 | 575 | 575 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.3 | Property taxes | - | - | - | - | - | - | 3,435 | 344 | 3,779 | 3,779 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.4 | Health physics supplies | - | 2,140 | - | - | - | - | - | 535 | 2,675 | 2,675 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.5 | Heavy equipment rental | - | 2,774 | - | - | - | - | - | 416 | 3,190 | 3,190 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.6 | Disposal of DAW generated | - | - | 70 | 28 | - | 290 | - | 84 | 472 | 472 | - | - | - | 3,521 | - | - | - | 70,425 | 115 | - |
| 2b.4.7 | Plant energy budget | - | - | - | - | - | - | 1,313 | 197 | 1,509 | 1,509 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.8 | NRC Fees | - | - | - | - | - | - | 638 | 64 | 701 | 701 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.9 | Emergency Planning Fees | - | - | - | - | - | - | 2,006 | 201 | 2,207 | - | 2,207 | - | - | - | - | - | - | - | - | - |
| 2b.4.10 | Fixed Overhead | - | - | - | - | - | - | 1,284 | 193 | 1,477 | 1,477 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.11 | Spent Fuel Pool O&M | - | - | - | - | - | - | 456 | 68 | 524 | - | 524 | - | - | - | - | - | - | - | - | - |
| 2b.4.12 | Liquid Radwaste Processing Equipment/Services | - | - | - | - | - | - | 229 | 34 | 264 | 264 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.13 | ISFSI Operating Costs | - | - | - | - | - | - | 60 | 9 | 69 | - | 69 | - | - | - | - | - | - | - | - | - |
| 2b.4.14 | Railroad Track Maintenance | - | - | - | - | - | - | 67 | 10 | 78 | 78 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.15 | Remedial Actions Surveys | - | - | - | - | - | - | 1,209 | 181 | 1,391 | 1,391 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.16 | Security Staff Cost | - | - | - | - | - | - | 8,259 | 1,239 | 9,497 | 9,497 | - | - | - | - | - | - | - | - | - | 121,244 |
| 2b.4.17 | DOC Staff Cost | - | - | - | - | - | - | 10,738 | 1,611 | 12,348 | 12,348 | - | - | - | - | - | - | - | - | - | 121,244 |
| 2b.4.18 | Utility Staff Cost | - | - | - | - | - | - | 13,928 | 2,089 | 16,017 | 16,017 | - | - | - | - | - | - | - | - | - | 225,649 |
| 2b.4 | Subtotal Period 2b Period-Dependent Costs | 511 | 4,914 | 70 | 28 | - | 290 | 44,145 | 7,454 | 57,412 | 54,612 | 2,800 | - | - | 3,521 | - | - | - | 70,425 | 115 | 468,137 |
| 2b.0 | TOTAL PERIOD 2b COST | 3,626 | 23,946 | 920 | 2,533 | 13,990 | 18,642 | 63,658 | 23,341 | 150,657 | 135,455 | 12,111 | 3,091 | 85,854 | 100,182 | - | - | - | 7,878,073 | 272,879 | 472,233 |
| PERIOD 2c - Spent fuel delay prior to SFP decon | | | | | | | | | | | | | | | | | | | | | |
| Period 2c Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| Period 2c Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 2c.3.1 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 51,274 | 7,691 | 58,965 | - | 58,965 | - | - | - | - | - | - | - | - | - |
| 2c.3.2 | Retention and Severance | - | - | - | - | - | - | 3,512 | 527 | 4,039 | 4,039 | - | - | - | - | - | - | - | - | - | - |
| 2c.3.3 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 1,526 | - | 1,526 | - | 1,526 | - | - | - | - | - | - | - | - | - |
| 2c.3 | Subtotal Period 2c Collateral Costs | - | - | - | - | - | - | 56,312 | 8,218 | 64,530 | 4,039 | 60,491 | - | - | - | - | - | - | - | - | - |
| Period 2c Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 2c.4.1 | Insurance | - | - | - | - | - | - | 592 | 59 | 651 | 651 | - | - | - | - | - | - | - | - | - | - |
| 2c.4.2 | Property taxes | - | - | - | - | - | - | 3,512 | 351 | 3,863 | 3,863 | - | - | - | - | - | - | - | - | - | - |
| 2c.4.3 | Health physics supplies | - | 263 | - | - | - | - | - | 66 | 328 | 328 | - | - | - | - | - | - | - | - | - | - |
| 2c.4.4 | Disposal of DAW generated | - | - | 9 | 4 | - | 38 | - | 11 | 61 | 61 | - | - | - | 457 | - | - | - | 9,141 | 15 | - |
| 2c.4.5 | Plant energy budget | - | - | - | - | - | - | 1,486 | 223 | 1,709 | 1,709 | - | - | - | - | - | - | - | - | - | - |
| 2c.4.6 | NRC Fees | - | - | - | - | - | - | 687 | 69 | 756 | 756 | - | - | - | - | - | - | - | - | - | - |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table D-1
Prairie Island DECON Unit 1
DECON Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|---------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| Period 2c Period-Dependent Costs (continued) | | | | | | | | | | | | | | | | | | | | | | |
| 2c.4.7 | Emergency Planning Fees | - | - | - | - | - | - | 2,271 | 227 | 2,498 | - | 2,498 | - | - | - | - | - | - | - | - | - | - |
| 2c.4.8 | Fixed Overhead | - | - | - | - | - | - | 1,454 | 218 | 1,672 | 1,672 | - | - | - | - | - | - | - | - | - | - | - |
| 2c.4.9 | Spent Fuel Pool O&M | - | - | - | - | - | - | 516 | 77 | 593 | - | 593 | - | - | - | - | - | - | - | - | - | - |
| 2c.4.10 | Liquid Radwaste Processing Equipment/Services | - | - | - | - | - | - | 260 | 39 | 298 | 298 | - | - | - | - | - | - | - | - | - | - | - |
| 2c.4.11 | ISFSI Operating Costs | - | - | - | - | - | - | 68 | 10 | 79 | - | 79 | - | - | - | - | - | - | - | - | - | - |
| 2c.4.12 | Railroad Track Maintenance | - | - | - | - | - | - | 76 | 11 | 88 | 88 | - | - | - | - | - | - | - | - | - | - | - |
| 2c.4.13 | Security Staff Cost | - | - | - | - | - | - | 9,348 | 1,402 | 10,751 | 10,751 | - | - | - | - | - | - | - | - | - | - | 137,246 |
| 2c.4.14 | Utility Staff Cost | - | - | - | - | - | - | 1,195 | 179 | 1,375 | 1,375 | - | - | - | - | - | - | - | - | - | - | 19,062 |
| 2c.4 | Subtotal Period 2c Period-Dependent Costs | - | 263 | 9 | 4 | - | 38 | 21,465 | 2,943 | 24,721 | 21,552 | 3,170 | - | - | 457 | - | - | - | 9,141 | 15 | 156,308 | |
| 2c.0 | TOTAL PERIOD 2c COST | - | 263 | 9 | 4 | - | 38 | 77,777 | 11,161 | 89,252 | 25,591 | 63,661 | - | - | 457 | - | - | - | 9,141 | 15 | 156,308 | |
| PERIOD 2d - Decontamination Following Wet Fuel Storage | | | | | | | | | | | | | | | | | | | | | | |
| Period 2d Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| 2d.1.1 | Remove spent fuel racks | 347 | 35 | 86 | 41 | - | 703 | - | 373 | 1,585 | 1,585 | - | - | - | 2,092 | - | - | - | 132,919 | 576 | - | - |
| Disposal of Plant Systems | | | | | | | | | | | | | | | | | | | | | | |
| 2d.1.2.1 | Electrical - Contaminated - Fuel Pool | - | 152 | 2 | 5 | 103 | 8 | - | 56 | 325 | 325 | - | - | - | 23 | - | - | - | 26,449 | 2,077 | - | - |
| 2d.1.2.2 | Electrical - Decontaminated - Fuel Pool | - | 947 | 12 | 43 | 986 | - | - | 392 | 2,380 | 2,380 | - | - | 5,893 | - | - | - | - | 239,327 | 12,340 | - | - |
| 2d.1.2.3 | HVAC - Contaminated - Fuel Pool | - | 160 | 4 | 11 | 234 | 18 | - | 82 | 508 | 508 | - | - | 1,398 | 53 | - | - | - | 60,110 | 2,157 | - | - |
| 2d.1.2.4 | Safeguards Chilled Water - RCA | - | 85 | 1 | 4 | 83 | - | - | 34 | 207 | 207 | - | - | 495 | - | - | - | - | 20,100 | 1,019 | - | - |
| 2d.1.2.5 | Spent Fuel Pool Cooling | 303 | 357 | 34 | 32 | 135 | 450 | - | 382 | 1,693 | 1,693 | - | - | 806 | 1,325 | - | - | - | 117,816 | 7,613 | - | - |
| 2d.1.2.6 | Station & Instrument Air - RCA Fuel Pool | - | 20 | 0 | 1 | 14 | - | - | 7 | 42 | 42 | - | - | 83 | - | - | - | - | 3,374 | 263 | - | - |
| 2d.1.2 | Totals | 303 | 1,721 | 52 | 96 | 1,554 | 476 | - | 954 | 5,157 | 5,157 | - | - | 9,290 | 1,401 | - | - | - | 467,176 | 25,468 | - | - |
| 2d.1.4 | Scaffolding in support of decommissioning | - | 233 | 1 | 0 | 6 | 1 | - | 59 | 301 | 301 | - | - | 35 | 3 | - | - | - | 1,746 | 1,592 | - | - |
| 2d.1 | Subtotal Period 2d Activity Costs | 650 | 1,989 | 139 | 138 | 1,561 | 1,180 | - | 1,386 | 7,042 | 7,042 | - | - | 9,325 | 3,496 | - | - | - | 601,841 | 27,637 | - | - |
| Period 2d Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 2d.2.1 | License Termination Survey Planning | - | - | - | - | - | - | 1,037 | 311 | 1,348 | 1,348 | - | - | - | - | - | - | - | - | - | - | 6,240 |
| 2d.2 | Subtotal Period 2d Additional Costs | - | - | - | - | - | - | 1,037 | 311 | 1,348 | 1,348 | - | - | - | - | - | - | - | - | - | - | 6,240 |
| Period 2d Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 2d.3.1 | Process decommissioning water waste | 30 | - | 21 | 38 | - | 86 | - | 44 | 220 | 220 | - | - | - | 197 | - | - | - | 11,793 | 38 | - | - |
| 2d.3.2 | Process decommissioning chemical flush waste | 1 | - | 34 | 110 | - | 251 | - | 83 | 478 | 478 | - | - | - | 324 | - | - | - | 34,576 | 61 | - | - |
| 2d.3.3 | Small tool allowance | - | 37 | - | - | - | - | - | 6 | 42 | 42 | - | - | - | - | - | - | - | - | - | - | - |
| 2d.3.4 | Decommissioning Equipment Disposition | - | - | 130 | 67 | 1,112 | 178 | - | 234 | 1,722 | 1,722 | - | - | 6,000 | 529 | - | - | - | 303,608 | 147 | - | - |
| 2d.3.5 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 975 | - | 975 | - | 975 | - | - | - | - | - | - | - | - | - | - |
| 2d.3 | Subtotal Period 2d Collateral Costs | 31 | 37 | 185 | 215 | 1,112 | 514 | 975 | 367 | 3,437 | 2,462 | 975 | - | 6,000 | 1,050 | - | - | - | 349,977 | 246 | - | - |
| Period 2d Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 2d.4.1 | Decon supplies | 59 | - | - | - | - | - | - | 15 | 73 | 73 | - | - | - | - | - | - | - | - | - | - | - |
| 2d.4.2 | Insurance | - | - | - | - | - | - | 378 | 38 | 416 | 416 | - | - | - | - | - | - | - | - | - | - | - |
| 2d.4.3 | Property taxes | - | - | - | - | - | - | 2,004 | 200 | 2,204 | 2,204 | - | - | - | - | - | - | - | - | - | - | - |
| 2d.4.4 | Health physics supplies | - | 575 | - | - | - | - | - | 144 | 719 | 719 | - | - | - | - | - | - | - | - | - | - | - |
| 2d.4.5 | Heavy equipment rental | - | 2,007 | - | - | - | - | - | 301 | 2,308 | 2,308 | - | - | - | - | - | - | - | - | - | - | - |
| 2d.4.6 | Disposal of DAW generated | - | - | 16 | 7 | - | 68 | - | 20 | 111 | 111 | - | - | - | 830 | - | - | - | 16,609 | 27 | - | - |
| 2d.4.7 | Plant energy budget | - | - | - | - | - | - | 506 | 76 | 582 | 582 | - | - | - | - | - | - | - | - | - | - | - |
| 2d.4.8 | NRC Fees | - | - | - | - | - | - | 439 | 44 | 483 | 483 | - | - | - | - | - | - | - | - | - | - | - |
| 2d.4.9 | Emergency Planning Fees | - | - | - | - | - | - | 58 | 6 | 64 | - | 64 | - | - | - | - | - | - | - | - | - | - |
| 2d.4.10 | Fixed Overhead | - | - | - | - | - | - | 929 | 139 | 1,068 | 1,068 | - | - | - | - | - | - | - | - | - | - | - |
| 2d.4.11 | Liquid Radwaste Processing Equipment/Services | - | - | - | - | - | - | 332 | 50 | 381 | 381 | - | - | - | - | - | - | - | - | - | - | - |
| 2d.4.12 | ISFSI Operating Costs | - | - | - | - | - | - | 44 | 7 | 50 | - | 50 | - | - | - | - | - | - | - | - | - | - |
| 2d.4.13 | Railroad Track Maintenance | - | - | - | - | - | - | 49 | 7 | 56 | 56 | - | - | - | - | - | - | - | - | - | - | - |
| 2d.4.14 | Remedial Actions Surveys | - | - | - | - | - | - | 875 | 131 | 1,006 | 1,006 | - | - | - | - | - | - | - | - | - | - | - |
| 2d.4.15 | Security Staff Cost | - | - | - | - | - | - | 5,782 | 867 | 6,649 | 4,694 | 1,955 | - | - | - | - | - | - | - | - | - | 84,454 |
| 2d.4.16 | DOC Staff Cost | - | - | - | - | - | - | 6,401 | 960 | 7,361 | 7,361 | - | - | - | - | - | - | - | - | - | - | 70,243 |
| 2d.4.17 | Utility Staff Cost | - | - | - | - | - | - | 8,100 | 1,215 | 9,315 | 8,858 | 456 | - | - | - | - | - | - | - | - | - | 126,681 |
| 2d.4 | Subtotal Period 2d Period-Dependent Costs | 59 | 2,582 | 16 | 7 | - | 68 | 25,896 | 4,220 | 32,848 | 30,323 | 2,525 | - | - | 830 | - | - | - | 16,609 | 27 | 281,377 | |
| 2d.0 | TOTAL PERIOD 2d COST | 740 | 4,608 | 340 | 360 | 2,673 | 1,763 | 27,908 | 6,284 | 44,675 | 41,175 | 3,501 | - | 15,325 | 5,377 | - | - | - | 968,427 | 27,910 | 287,617 | |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table D-1
Prairie Island DECON Unit 1
DECON Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|---|---|--------------|---------------|-----------------|-----------------|---------------------------|---------------------|----------------|-------------------|----------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|--------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| PERIOD 2f - License Termination | | | | | | | | | | | | | | | | | | | | | | |
| Period 2f Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| 2f.1.1 | ORISE confirmatory survey | - | - | - | - | - | - | 166 | 50 | 216 | 216 | - | - | - | - | - | - | - | - | - | - | |
| 2f.1.2 | Terminate license | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - | |
| 2f.1 | Subtotal Period 2f Activity Costs | - | - | - | - | - | - | 166 | 50 | 216 | 216 | - | - | - | - | - | - | - | - | - | - | |
| Period 2f Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 2f.2.1 | License Termination Survey | - | - | - | - | - | - | 3,199 | 960 | 4,159 | 4,159 | - | - | - | - | - | - | - | - | - | 40,531 | 3,120 |
| 2f.2 | Subtotal Period 2f Additional Costs | - | - | - | - | - | - | 3,199 | 960 | 4,159 | 4,159 | - | - | - | - | - | - | - | - | - | 40,531 | 3,120 |
| Period 2f Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 2f.3.1 | DOC staff relocation expenses | - | - | - | - | - | - | 1,264 | 190 | 1,454 | 1,454 | - | - | - | - | - | - | - | - | - | - | - |
| 2f.3.2 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 934 | - | 934 | - | 934 | - | - | - | - | - | - | - | - | - | - |
| 2f.3 | Subtotal Period 2f Collateral Costs | - | - | - | - | - | - | 2,198 | 190 | 2,388 | 1,454 | 934 | - | - | - | - | - | - | - | - | - | - |
| Period 2f Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 2f.4.1 | Insurance | - | - | - | - | - | - | 362 | 36 | 398 | 398 | - | - | - | - | - | - | - | - | - | - | - |
| 2f.4.2 | Property taxes | - | - | - | - | - | - | 1,771 | 177 | 1,948 | 1,948 | - | - | - | - | - | - | - | - | - | - | - |
| 2f.4.3 | Health physics supplies | - | 501 | - | - | - | - | - | 125 | 626 | 626 | - | - | - | - | - | - | - | - | - | - | - |
| 2f.4.4 | Disposal of DAW generated | - | - | 7 | 3 | - | 28 | - | 8 | 45 | 45 | - | - | 334 | - | - | - | - | - | 6,685 | 11 | - |
| 2f.4.5 | Plant energy budget | - | - | - | - | - | - | 243 | 36 | 279 | 279 | - | - | - | - | - | - | - | - | - | - | - |
| 2f.4.6 | NRC Fees | - | - | - | - | - | - | 422 | 42 | 465 | 465 | - | - | - | - | - | - | - | - | - | - | - |
| 2f.4.7 | Emergency Planning Fees | - | - | - | - | - | - | 55 | 6 | 61 | - | 61 | - | - | - | - | - | - | - | - | - | - |
| 2f.4.8 | Fixed Overhead | - | - | - | - | - | - | 890 | 133 | 1,023 | 1,023 | - | - | - | - | - | - | - | - | - | - | - |
| 2f.4.9 | ISFSI Operating Costs | - | - | - | - | - | - | 42 | 6 | 48 | - | 48 | - | - | - | - | - | - | - | - | - | - |
| 2f.4.10 | Railroad Track Maintenance | - | - | - | - | - | - | 47 | 7 | 54 | 54 | - | - | - | - | - | - | - | - | - | - | - |
| 2f.4.11 | Security Staff Cost | - | - | - | - | - | - | 5,538 | 831 | 6,369 | 4,497 | 1,873 | - | - | - | - | - | - | - | - | - | 80,898 |
| 2f.4.12 | DOC Staff Cost | - | - | - | - | - | - | 4,238 | 636 | 4,874 | 4,874 | - | - | - | - | - | - | - | - | - | - | 46,283 |
| 2f.4.13 | Utility Staff Cost | - | - | - | - | - | - | 4,011 | 602 | 4,613 | 4,175 | 438 | - | - | - | - | - | - | - | - | - | 59,507 |
| 2f.4 | Subtotal Period 2f Period-Dependent Costs | - | 501 | 7 | 3 | - | 28 | 17,620 | 2,646 | 20,803 | 18,384 | 2,420 | - | 334 | - | - | - | - | 6,685 | 11 | 186,687 | |
| 2f.0 | TOTAL PERIOD 2f COST | - | 501 | 7 | 3 | - | 28 | 23,183 | 3,845 | 27,566 | 24,212 | 3,354 | - | 334 | - | - | - | - | 6,685 | 40,542 | 189,807 | |
| PERIOD 2 TOTALS | | 5,134 | 58,338 | 20,860 | 7,153 | 22,473 | 41,926 | 284,307 | 84,964 | 525,155 | 429,593 | 89,987 | 5,576 | 138,734 | 144,239 | 237 | 673 | - | 13,198,890 | 527,156 | 1,927,726 | |
| PERIOD 3b - Site Restoration | | | | | | | | | | | | | | | | | | | | | | |
| Period 3b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Demolition of Remaining Site Buildings | | | | | | | | | | | | | | | | | | | | | | |
| 3b.1.1.1 | Reactor | - | 4,644 | - | - | - | - | - | 697 | 5,341 | - | - | 5,341 | - | - | - | - | - | - | - | 44,669 | - |
| 3b.1.1.2 | Condensate Storage Tank Foundation | - | 3 | - | - | - | - | - | 0 | 4 | - | - | 4 | - | - | - | - | - | - | - | 16 | - |
| 3b.1.1.3 | Structures below 3' below grade | - | 1,651 | - | - | - | - | - | 248 | 1,899 | - | - | 1,899 | - | - | - | - | - | - | - | 8,411 | - |
| 3b.1.1.4 | Turbine | - | 2,139 | - | - | - | - | - | 321 | 2,460 | - | - | 2,460 | - | - | - | - | - | - | - | 21,985 | - |
| 3b.1.1.5 | Turbine Pedestal | - | 365 | - | - | - | - | - | 55 | 420 | - | - | 420 | - | - | - | - | - | - | - | 1,857 | - |
| 3b.1.1 | Totals | - | 8,803 | - | - | - | - | - | 1,320 | 10,123 | - | - | 10,123 | - | - | - | - | - | - | - | 76,939 | - |
| Site Closeout Activities | | | | | | | | | | | | | | | | | | | | | | |
| 3b.1.2 | Grade & landscape site | - | 448 | - | - | - | - | - | 67 | 515 | - | - | 515 | - | - | - | - | - | - | - | 921 | - |
| 3b.1.3 | Final report to NRC | - | - | - | - | - | - | 200 | 30 | 231 | 231 | - | - | - | - | - | - | - | - | - | - | 1,560 |
| 3b.1 | Subtotal Period 3b Activity Costs | - | 9,251 | - | - | - | - | 200 | 1,418 | 10,869 | 231 | - | 10,639 | - | - | - | - | - | - | - | 77,859 | 1,560 |
| Period 3b Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3b.2.1 | Clean Concrete Disposal | - | 2,242 | - | - | - | - | 5 | 337 | 2,583 | - | - | 2,583 | - | - | - | - | - | - | - | 8,386 | - |
| 3b.2.2 | Intake Structure Cofferdam | - | 623 | - | - | - | - | - | 93 | 716 | - | - | 716 | - | - | - | - | - | - | - | 5,168 | - |
| 3b.2.3 | Construction Debris | - | - | - | - | - | - | 10 | 2 | 12 | - | - | 12 | - | - | - | - | - | - | - | - | - |
| 3b.2.4 | Backfill | - | 3,011 | - | - | - | - | - | 452 | 3,462 | - | - | 3,462 | - | - | - | - | - | - | - | 2,904 | - |
| 3b.2 | Subtotal Period 3b Additional Costs | - | 5,875 | - | - | - | - | 15 | 883 | 6,773 | - | - | 6,773 | - | - | - | - | - | - | - | 16,458 | - |
| Period 3b Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3b.3.1 | Small tool allowance | - | 120 | - | - | - | - | - | 18 | 138 | - | - | 138 | - | - | - | - | - | - | - | - | - |
| 3b.3.2 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 2,649 | - | 2,649 | - | 2,649 | - | - | - | - | - | - | - | - | - | - |
| 3b.3 | Subtotal Period 3b Collateral Costs | - | 120 | - | - | - | - | 2,649 | 18 | 2,787 | - | 2,649 | 138 | - | - | - | - | - | - | - | - | - |
| Period 3b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3b.4.1 | Insurance | - | - | - | - | - | - | 513 | 51 | 565 | 565 | - | - | - | - | - | - | - | - | - | - | - |
| 3b.4.2 | Property taxes | - | - | - | - | - | - | 4,167 | 417 | 4,583 | - | 4,583 | - | - | - | - | - | - | - | - | - | - |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table D-1
Prairie Island DECON Unit 1
DECON Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|-----------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| Period 3b Period-Dependent Costs (continued) | | | | | | | | | | | | | | | | | | | | | | |
| 3b.4.3 | Heavy equipment rental | - | 7,144 | - | - | - | - | - | 1,072 | 8,215 | - | - | 8,215 | - | - | - | - | - | - | - | - | - |
| 3b.4.4 | Plant energy budget | - | - | - | - | - | - | 344 | 52 | 395 | - | 395 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.5 | NRC ISFSI Fees | - | - | - | - | - | - | 218 | 22 | 239 | - | 239 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.6 | Emergency Planning Fees | - | - | - | - | - | - | 157 | 16 | 173 | - | 173 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.7 | Fixed Overhead | - | - | - | - | - | - | 1,024 | 154 | 1,178 | 397 | 781 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.8 | ISFSI Operating Costs | - | - | - | - | - | - | 119 | 18 | 136 | - | 136 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.9 | Railroad Track Maintenance | - | - | - | - | - | - | 361 | 54 | 416 | 153 | 263 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.10 | Security Staff Cost | - | - | - | - | - | - | 4,616 | 692 | 5,308 | - | 5,308 | - | - | - | - | - | - | - | - | - | 57,340 |
| 3b.4.11 | DOC Staff Cost | - | - | - | - | - | - | 10,921 | 1,638 | 12,559 | - | - | 12,559 | - | - | - | - | - | - | - | - | 116,885 |
| 3b.4.12 | Utility Staff Cost | - | - | - | - | - | - | 5,004 | 751 | 5,755 | - | 1,237 | 4,517 | - | - | - | - | - | - | - | - | 74,431 |
| 3b.4 | Subtotal Period 3b Period-Dependent Costs | - | 7,144 | - | - | - | - | 27,444 | 4,935 | 39,523 | 1,114 | 13,117 | 25,292 | - | - | - | - | - | - | - | - | 248,656 |
| 3b.0 | TOTAL PERIOD 3b COST | - | 22,390 | - | - | - | - | 30,308 | 7,255 | 59,952 | 1,345 | 15,766 | 42,842 | - | - | - | - | - | - | - | 94,317 | 250,216 |
| PERIOD 3c - Fuel Storage Operations/Shipping | | | | | | | | | | | | | | | | | | | | | | |
| Period 3c Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Period 3c Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3c.3.1 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 18,191 | 2,729 | 20,919 | - | 20,919 | - | - | - | - | - | - | - | - | - | - |
| 3c.3.2 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 44,363 | - | 44,363 | - | 44,363 | - | - | - | - | - | - | - | - | - | - |
| 3c.3 | Subtotal Period 3c Collateral Costs | - | - | - | - | - | - | 62,554 | 2,729 | 65,283 | - | 65,283 | - | - | - | - | - | - | - | - | - | - |
| Period 3c Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3c.4.1 | Insurance | - | - | - | - | - | - | 8,599 | 860 | 9,459 | - | 9,459 | - | - | - | - | - | - | - | - | - | - |
| 3c.4.2 | Property taxes | - | - | - | - | - | - | 49,245 | 4,924 | 54,169 | - | 54,169 | - | - | - | - | - | - | - | - | - | - |
| 3c.4.3 | Plant energy budget | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 3c.4.4 | NRC ISFSI Fees | - | - | - | - | - | - | 5,140 | 514 | 5,653 | - | 5,653 | - | - | - | - | - | - | - | - | - | - |
| 3c.4.5 | Emergency Planning Fees | - | - | - | - | - | - | 2,633 | 263 | 2,896 | - | 2,896 | - | - | - | - | - | - | - | - | - | - |
| 3c.4.6 | Fixed Overhead | - | - | - | - | - | - | 5,787 | 868 | 6,655 | - | 6,655 | - | - | - | - | - | - | - | - | - | - |
| 3c.4.7 | ISFSI Operating Costs | - | - | - | - | - | - | 1,988 | 298 | 2,286 | - | 2,286 | - | - | - | - | - | - | - | - | - | - |
| 3c.4.8 | Railroad Track Maintenance | - | - | - | - | - | - | 2,220 | 333 | 2,554 | - | 2,554 | - | - | - | - | - | - | - | - | - | - |
| 3c.4.9 | Security Staff Cost | - | - | - | - | - | - | 77,306 | 11,596 | 88,902 | - | 88,902 | - | - | - | - | - | - | - | - | - | 960,328 |
| 3c.4.10 | Utility Staff Cost | - | - | - | - | - | - | 18,035 | 2,705 | 20,740 | - | 20,740 | - | - | - | - | - | - | - | - | - | 249,316 |
| 3c.4 | Subtotal Period 3c Period-Dependent Costs | - | - | - | - | - | - | 170,952 | 22,362 | 193,314 | - | 193,314 | - | - | - | - | - | - | - | - | - | 1,209,643 |
| 3c.0 | TOTAL PERIOD 3c COST | - | - | - | - | - | - | 233,506 | 25,091 | 258,597 | - | 258,597 | - | - | - | - | - | - | - | - | - | 1,209,643 |
| PERIOD 3d - GTCC shipping | | | | | | | | | | | | | | | | | | | | | | |
| Period 3d Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Nuclear Steam Supply System Removal | | | | | | | | | | | | | | | | | | | | | | |
| 3d.1.1.1 | Vessel & Internals GTCC Disposal | - | - | 1,444 | - | - | - | 8,680 | 1,663 | 11,787 | 11,787 | - | - | - | - | - | - | - | 1,773 | 344,823 | - | - |
| 3d.1.1 | Totals | - | - | 1,444 | - | - | - | 8,680 | 1,663 | 11,787 | 11,787 | - | - | - | - | - | - | - | 1,773 | 344,823 | - | - |
| 3d.1 | Subtotal Period 3d Activity Costs | - | - | 1,444 | - | - | - | 8,680 | 1,663 | 11,787 | 11,787 | - | - | - | - | - | - | - | 1,773 | 344,823 | - | - |
| Period 3d Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3d.3.1 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 28 | 4 | 32 | - | 32 | - | - | - | - | - | - | - | - | - | - |
| 3d.3.2 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 48 | - | 48 | - | 48 | - | - | - | - | - | - | - | - | - | - |
| 3d.3 | Subtotal Period 3d Collateral Costs | - | - | - | - | - | - | 76 | 4 | 80 | - | 80 | - | - | - | - | - | - | - | - | - | - |
| Period 3d Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3d.4.1 | Insurance | - | - | - | - | - | - | 9 | 1 | 10 | 10 | - | - | - | - | - | - | - | - | - | - | - |
| 3d.4.2 | Property taxes | - | - | - | - | - | - | 53 | 5 | 58 | 58 | - | - | - | - | - | - | - | - | - | - | - |
| 3d.4.4 | NRC ISFSI Fees | - | - | - | - | - | - | 4 | 0 | 4 | - | 4 | - | - | - | - | - | - | - | - | - | - |
| 3d.4.5 | Emergency Planning Fees | - | - | - | - | - | - | 3 | 0 | 3 | - | 3 | - | - | - | - | - | - | - | - | - | - |
| 3d.4.6 | Fixed Overhead | - | - | - | - | - | - | 6 | 1 | 7 | 7 | - | - | - | - | - | - | - | - | - | - | - |
| 3d.4.7 | Railroad Track Maintenance | - | - | - | - | - | - | 2 | 0 | 3 | 3 | - | - | - | - | - | - | - | - | - | - | - |
| 3d.4.8 | Security Staff Cost | - | - | - | - | - | - | 83 | 13 | 96 | 96 | - | - | - | - | - | - | - | - | - | - | 1,037 |
| 3d.4.9 | Utility Staff Cost | - | - | - | - | - | - | 19 | 3 | 22 | 22 | - | - | - | - | - | - | - | - | - | - | 269 |
| 3d.4 | Subtotal Period 3d Period-Dependent Costs | - | - | - | - | - | - | 181 | 24 | 204 | 197 | 7 | - | - | - | - | - | - | - | - | - | 1,306 |
| 3d.0 | TOTAL PERIOD 3d COST | - | - | 1,444 | - | - | - | 8,680 | 1,691 | 12,071 | 11,984 | 87 | - | - | - | - | - | - | 1,773 | 344,823 | - | 1,306 |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table D-1
Prairie Island DECON Unit 1
DECON Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| PERIOD 3e - ISFSI Decontamination | | | | | | | | | | | | | | | | | | | | | |
| Period 3e Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| Period 3e Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 3e.2.1 | License Termination ISFSI | - | 24 | 81 | 435 | - | 2,532 | 839 | 978 | 4,890 | 4,890 | - | - | - | 9,355 | - | - | - | 1,123,457 | 3,762 | 1,065 |
| 3e.2 | Subtotal Period 3e Additional Costs | - | 24 | 81 | 435 | - | 2,532 | 839 | 978 | 4,890 | 4,890 | - | - | - | 9,355 | - | - | - | 1,123,457 | 3,762 | 1,065 |
| Period 3e Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 3e.4.1 | Insurance | - | - | - | - | - | - | 93 | 23 | 116 | 116 | - | - | - | - | - | - | - | - | - | - |
| 3e.4.2 | Property taxes | - | - | - | - | - | - | 56 | 14 | 69 | 69 | - | - | - | - | - | - | - | - | - | - |
| 3e.4.3 | Plant energy budget | - | - | - | - | - | - | 11 | 3 | 13 | 13 | - | - | - | - | - | - | - | - | - | - |
| 3e.4.4 | Fixed Overhead | - | - | - | - | - | - | 54 | 14 | 68 | 68 | - | - | - | - | - | - | - | - | - | - |
| 3e.4.5 | Railroad Track Maintenance | - | - | - | - | - | - | 21 | 5 | 26 | 26 | - | - | - | - | - | - | - | - | - | - |
| 3e.4.6 | Security Staff Cost | - | - | - | - | - | - | 174 | 43 | 217 | 217 | - | - | - | - | - | - | - | - | - | 2,500 |
| 3e.4.7 | Utility Staff Cost | - | - | - | - | - | - | 129 | 32 | 161 | 161 | - | - | - | - | - | - | - | - | - | 1,896 |
| 3e.4 | Subtotal Period 3e Period-Dependent Costs | - | - | - | - | - | - | 536 | 134 | 670 | 670 | - | - | - | - | - | - | - | - | - | 4,396 |
| 3e.0 | TOTAL PERIOD 3e COST | - | 24 | 81 | 435 | - | 2,532 | 1,375 | 1,112 | 5,560 | 5,560 | - | - | - | 9,355 | - | - | - | 1,123,457 | 3,762 | 5,460 |
| PERIOD 3f - ISFSI Site Restoration | | | | | | | | | | | | | | | | | | | | | |
| Period 3f Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| Period 3f Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 3f.2.1 | Demolition and Site Restoration of ISFSI | - | 515 | - | - | - | - | 68 | 87 | 670 | - | - | 670 | - | - | - | - | - | - | 2,219 | 80 |
| 3f.2 | Subtotal Period 3f Additional Costs | - | 515 | - | - | - | - | 68 | 87 | 670 | - | - | 670 | - | - | - | - | - | - | 2,219 | 80 |
| Period 3f Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 3f.3.1 | Small tool allowance | - | 3 | - | - | - | - | - | 0 | 4 | - | - | 4 | - | - | - | - | - | - | - | - |
| 3f.3 | Subtotal Period 3f Collateral Costs | - | 3 | - | - | - | - | - | 0 | 4 | - | - | 4 | - | - | - | - | - | - | - | - |
| Period 3f Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 3f.4.2 | Property taxes | - | - | - | - | - | - | 28 | 3 | 31 | - | - | 31 | - | - | - | - | - | - | - | - |
| 3f.4.3 | Heavy equipment rental | - | 59 | - | - | - | - | - | 9 | 68 | - | - | 68 | - | - | - | - | - | - | - | - |
| 3f.4.4 | Plant energy budget | - | - | - | - | - | - | 6 | 1 | 6 | - | - | 6 | - | - | - | - | - | - | - | - |
| 3f.4.5 | Fixed Overhead | - | - | - | - | - | - | 28 | 4 | 32 | - | - | 32 | - | - | - | - | - | - | - | - |
| 3f.4.6 | Railroad Track Maintenance | - | - | - | - | - | - | 11 | 2 | 12 | - | - | 12 | - | - | - | - | - | - | - | - |
| 3f.4.7 | Security Staff Cost | - | - | - | - | - | - | 89 | 13 | 102 | - | - | 102 | - | - | - | - | - | - | - | 1,281 |
| 3f.4.8 | Utility Staff Cost | - | - | - | - | - | - | 55 | 8 | 63 | - | - | 63 | - | - | - | - | - | - | - | 795 |
| 3f.4 | Subtotal Period 3f Period-Dependent Costs | - | 59 | - | - | - | - | 216 | 40 | 315 | - | - | 315 | - | - | - | - | - | - | - | 2,076 |
| 3f.0 | TOTAL PERIOD 3f COST | - | 577 | - | - | - | - | 284 | 128 | 989 | - | - | 989 | - | - | - | - | - | - | 2,219 | 2,156 |
| PERIOD 3 TOTALS | | | | | | | | | | | | | | | | | | | | | |
| TOTAL COST TO DECOMMISSION | | | | | | | | | | | | | | | | | | | | | |
| | | 8,929 | 87,309 | 22,838 | 8,068 | 22,651 | 58,542 | 668,385 | 141,143 | 1,017,865 | 595,962 | 370,904 | 50,998 | 144,866 | 167,555 | 826 | 673 | 1,773 | 15,277,230 | 672,967 | 4,397,236 |

**Prairie Island Nuclear Generating Plant
 Decommissioning Cost Analysis**

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**Table D-1
 Prairie Island DECON Unit 1
 DECON Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
 (Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|--|----------------------|------------|--------------|-----------------|--------------------|----------------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| TOTAL COST TO DECOMMISSION WITH 16.1% CONTINGENCY: | | | | | \$1,017,865 | thousands of 2020 dollars | | | | | | | | | | | | | | | |
| TOTAL NRC LICENSE TERMINATION COST IS 58.55% OR: | | | | | \$595,962 | thousands of 2020 dollars | | | | | | | | | | | | | | | |
| SPENT FUEL MANAGEMENT COST IS 36.44% OR: | | | | | \$370,904 | thousands of 2020 dollars | | | | | | | | | | | | | | | |
| NON-NUCLEAR DEMOLITION COST IS 5.01% OR: | | | | | \$50,998 | thousands of 2020 dollars | | | | | | | | | | | | | | | |
| TOTAL LOW-LEVEL RADIOACTIVE WASTE VOLUME BURIED (EXCLUDING GTCC): | | | | | 169,054 | Cubic Feet | | | | | | | | | | | | | | | |
| TOTAL GREATER THAN CLASS C RADWASTE VOLUME GENERATED: | | | | | 1,773 | Cubic Feet | | | | | | | | | | | | | | | |
| TOTAL SCRAP METAL REMOVED: | | | | | 32,925 | Tons | | | | | | | | | | | | | | | |
| TOTAL CRAFT LABOR REQUIREMENTS: | | | | | 672,967 | Man-hours | | | | | | | | | | | | | | | |

End Notes:
 n/a - indicates that this activity not charged as decommissioning expense
 a - indicates that this activity performed by decommissioning staff
 0 - indicates that this value is less than 0.5 but is non-zero
 A cell containing " - " indicates a zero value

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table D-2
Prairie Island DECON Unit 2
DECON Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|--|--|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| PERIOD 1a - Shutdown through Transition | | | | | | | | | | | | | | | | | | | | | |
| Period 1a Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| 1a.1.1 | Prepare preliminary decommissioning cost | - | - | - | - | - | - | 71 | 11 | 82 | 82 | - | - | - | - | - | - | - | - | - | 556 |
| 1a.1.2 | Notification of Cessation of Operations | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.3 | Remove fuel & source material | - | - | - | - | - | - | - | - | n/a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.4 | Notification of Permanent Defueling | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.5 | Deactivate plant systems & process waste | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.6 | Prepare and submit PSDAR | - | - | - | - | - | - | 110 | 16 | 126 | 126 | - | - | - | - | - | - | - | - | - | 855 |
| 1a.1.7 | Review plant dwgs & specs. | - | - | - | - | - | - | 253 | 38 | 291 | 291 | - | - | - | - | - | - | - | - | - | 1,967 |
| 1a.1.8 | Perform detailed rad survey | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.9 | Estimate by-product inventory | - | - | - | - | - | - | 55 | 8 | 63 | 63 | - | - | - | - | - | - | - | - | - | 428 |
| 1a.1.10 | End product description | - | - | - | - | - | - | 55 | 8 | 63 | 63 | - | - | - | - | - | - | - | - | - | 428 |
| 1a.1.11 | Detailed by-product inventory | - | - | - | - | - | - | 71 | 11 | 82 | 82 | - | - | - | - | - | - | - | - | - | 556 |
| 1a.1.12 | Define major work sequence | - | - | - | - | - | - | 412 | 62 | 474 | 474 | - | - | - | - | - | - | - | - | - | 3,207 |
| 1a.1.13 | Perform SER and EA | - | - | - | - | - | - | 170 | 26 | 196 | 196 | - | - | - | - | - | - | - | - | - | 1,326 |
| 1a.1.14 | Prepare/submit Defueled Technical Specifications | - | - | - | - | - | - | 412 | 62 | 474 | 474 | - | - | - | - | - | - | - | - | - | 3,207 |
| 1a.1.15 | Perform Site-Specific Cost Study | - | - | - | - | - | - | 275 | 41 | 316 | 316 | - | - | - | - | - | - | - | - | - | 2,138 |
| 1a.1.16 | Prepare/submit Irradiated Fuel Management Plan | - | - | - | - | - | - | 55 | 8 | 63 | 63 | - | - | - | - | - | - | - | - | - | 428 |
| Activity Specifications | | | | | | | | | | | | | | | | | | | | | |
| 1a.1.17.1 | Plant & temporary facilities | - | - | - | - | - | - | 270 | 41 | 311 | 280 | - | 31 | - | - | - | - | - | - | - | 2,104 |
| 1a.1.17.2 | Plant systems | - | - | - | - | - | - | 229 | 34 | 263 | 237 | - | 26 | - | - | - | - | - | - | - | 1,782 |
| 1a.1.17.3 | NSSS Decontamination Flush | - | - | - | - | - | - | 27 | 4 | 32 | 32 | - | - | - | - | - | - | - | - | - | 214 |
| 1a.1.17.4 | Reactor internals | - | - | - | - | - | - | 390 | 59 | 449 | 449 | - | - | - | - | - | - | - | - | - | 3,036 |
| 1a.1.17.5 | Reactor vessel | - | - | - | - | - | - | 357 | 54 | 411 | 411 | - | - | - | - | - | - | - | - | - | 2,779 |
| 1a.1.17.6 | Biological shield | - | - | - | - | - | - | 27 | 4 | 32 | 32 | - | - | - | - | - | - | - | - | - | 214 |
| 1a.1.17.7 | Steam generators | - | - | - | - | - | - | 171 | 26 | 197 | 197 | - | - | - | - | - | - | - | - | - | 1,334 |
| 1a.1.17.8 | Reinforced concrete | - | - | - | - | - | - | 88 | 13 | 101 | 51 | - | 51 | - | - | - | - | - | - | - | 684 |
| 1a.1.17.9 | Main Turbine | - | - | - | - | - | - | 22 | 3 | 25 | - | - | 25 | - | - | - | - | - | - | - | 171 |
| 1a.1.17.10 | Main Condensers | - | - | - | - | - | - | 22 | 3 | 25 | - | - | 25 | - | - | - | - | - | - | - | 171 |
| 1a.1.17.11 | Plant structures & buildings | - | - | - | - | - | - | 171 | 26 | 197 | 99 | - | 99 | - | - | - | - | - | - | - | 1,334 |
| 1a.1.17.12 | Waste management | - | - | - | - | - | - | 253 | 38 | 291 | 291 | - | - | - | - | - | - | - | - | - | 1,967 |
| 1a.1.17.13 | Facility & site closeout | - | - | - | - | - | - | 49 | 7 | 57 | 28 | - | 28 | - | - | - | - | - | - | - | 385 |
| 1a.1.17 | Total | - | - | - | - | - | - | 2,079 | 312 | 2,391 | 2,105 | - | 286 | - | - | - | - | - | - | - | 16,175 |
| Planning & Site Preparations | | | | | | | | | | | | | | | | | | | | | |
| 1a.1.18 | Prepare dismantling sequence | - | - | - | - | - | - | 132 | 20 | 152 | 152 | - | - | - | - | - | - | - | - | - | 1,026 |
| 1a.1.19 | Plant prep. & temp. svces | - | - | - | - | - | - | 3,500 | 525 | 4,025 | 4,025 | - | - | - | - | - | - | - | - | - | - |
| 1a.1.20 | Design water clean-up system | - | - | - | - | - | - | 77 | 12 | 88 | 88 | - | - | - | - | - | - | - | - | - | 599 |
| 1a.1.21 | Rigging/Cont. Cntrl Envlp/tooling/etc. | - | - | - | - | - | - | 2,400 | 360 | 2,760 | 2,760 | - | - | - | - | - | - | - | - | - | - |
| 1a.1.22 | Procure casks/liners & containers | - | - | - | - | - | - | 68 | 10 | 78 | 78 | - | - | - | - | - | - | - | - | - | 526 |
| 1a.1 | Subtotal Period 1a Activity Costs | - | - | - | - | - | - | 10,195 | 1,529 | 11,724 | 11,439 | - | 286 | - | - | - | - | - | - | - | 33,420 |
| Period 1a Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 1a.2.1 | Spent Fuel Pool Isolation | - | - | - | - | - | - | 8,450 | 1,268 | 9,718 | 9,718 | - | - | - | - | - | - | - | - | - | - |
| 1a.2 | Subtotal Period 1a Additional Costs | - | - | - | - | - | - | 8,450 | 1,268 | 9,718 | 9,718 | - | - | - | - | - | - | - | - | - | - |
| Period 1a Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 1a.3.1 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 1,330 | 199 | 1,529 | - | 1,529 | - | - | - | - | - | - | - | - | - |
| 1a.3.2 | Retention and Severance | - | - | - | - | - | - | 8,394 | 1,259 | 9,653 | 9,653 | - | - | - | - | - | - | - | - | - | - |
| 1a.3.3 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 1,249 | - | 1,249 | - | 1,249 | - | - | - | - | - | - | - | - | - |
| 1a.3 | Subtotal Period 1a Collateral Costs | - | - | - | - | - | - | 10,973 | 1,459 | 12,432 | 9,653 | 2,779 | - | - | - | - | - | - | - | - | - |
| Period 1a Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 1a.4.1 | Insurance | - | - | - | - | - | - | 1,660 | 166 | 1,826 | 1,826 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.2 | Property taxes | - | - | - | - | - | - | 3,623 | 362 | 3,985 | 3,985 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.3 | Health physics supplies | - | 578 | - | - | - | - | - | 144 | 722 | 722 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.4 | Heavy equipment rental | - | 753 | - | - | - | - | - | 113 | 866 | 866 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.5 | Disposal of DAW generated | - | - | 11 | 5 | - | 47 | - | 13 | 76 | 76 | - | - | 565 | - | - | - | - | 11,299 | 18 | - |
| 1a.4.6 | Plant energy budget | - | - | - | - | - | - | 1,621 | 243 | 1,864 | 1,864 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.7 | NRC Fees | - | - | - | - | - | - | 638 | 64 | 702 | 702 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.8 | Emergency Planning Fees | - | - | - | - | - | - | 2,174 | 217 | 2,392 | - | 2,392 | - | - | - | - | - | - | - | - | - |
| 1a.4.9 | Fixed Overhead | - | - | - | - | - | - | 1,440 | 216 | 1,656 | 1,656 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.10 | Spent Fuel Pool O&M | - | - | - | - | - | - | 422 | 63 | 486 | 486 | - | 486 | - | - | - | - | - | - | - | - |
| 1a.4.11 | ISFSI Operating Costs | - | - | - | - | - | - | 56 | 8 | 64 | - | 64 | - | - | - | - | - | - | - | - | - |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table D-2
Prairie Island DECON Unit 2
DECON Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|--|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| Period 1a Period-Dependent Costs (continued) | | | | | | | | | | | | | | | | | | | | | |
| 1a.4.12 | Railroad Track Maintenance | - | - | - | - | - | - | 63 | 9 | 72 | 72 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.13 | Security Staff Cost | - | - | - | - | - | - | 8,328 | 1,249 | 9,577 | 9,577 | - | - | - | - | - | - | - | - | - | 122,720 |
| 1a.4.14 | Utility Staff Cost | - | - | - | - | - | - | 21,681 | 3,252 | 24,933 | 24,933 | - | - | - | - | - | - | - | - | - | 345,280 |
| 1a.4 | Subtotal Period 1a Period-Dependent Costs | - | 1,331 | 11 | 5 | - | 47 | 41,706 | 6,122 | 49,221 | 46,279 | 2,942 | - | - | 565 | - | - | - | 11,299 | 18 | 468,000 |
| 1a.0 | TOTAL PERIOD 1a COST | - | 1,331 | 11 | 5 | - | 47 | 71,324 | 10,377 | 83,095 | 77,089 | 5,720 | 286 | - | 565 | - | - | - | 11,299 | 18 | 501,420 |
| PERIOD 1b - Decommissioning Preparations | | | | | | | | | | | | | | | | | | | | | |
| Period 1b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| Detailed Work Procedures | | | | | | | | | | | | | | | | | | | | | |
| 1b.1.1.1 | Plant systems | - | - | - | - | - | - | 260 | 39 | 299 | 269 | - | 30 | - | - | - | - | - | - | - | 2,024 |
| 1b.1.1.2 | NSSS Decontamination Flush | - | - | - | - | - | - | 55 | 8 | 63 | 63 | - | - | - | - | - | - | - | - | - | 428 |
| 1b.1.1.3 | Reactor internals | - | - | - | - | - | - | 137 | 21 | 158 | 158 | - | - | - | - | - | - | - | - | - | 1,069 |
| 1b.1.1.4 | Remaining buildings | - | - | - | - | - | - | 74 | 11 | 85 | 21 | - | 64 | - | - | - | - | - | - | - | 577 |
| 1b.1.1.5 | CRD cooling assembly | - | - | - | - | - | - | 55 | 8 | 63 | 63 | - | - | - | - | - | - | - | - | - | 428 |
| 1b.1.1.6 | CRD housings & ICI tubes | - | - | - | - | - | - | 55 | 8 | 63 | 63 | - | - | - | - | - | - | - | - | - | 428 |
| 1b.1.1.7 | Incore instrumentation | - | - | - | - | - | - | 55 | 8 | 63 | 63 | - | - | - | - | - | - | - | - | - | 428 |
| 1b.1.1.8 | Reactor vessel | - | - | - | - | - | - | 199 | 30 | 229 | 229 | - | - | - | - | - | - | - | - | - | 1,552 |
| 1b.1.1.9 | Facility closeout | - | - | - | - | - | - | 66 | 10 | 76 | 38 | - | 38 | - | - | - | - | - | - | - | 513 |
| 1b.1.1.10 | Missile shields | - | - | - | - | - | - | 25 | 4 | 28 | 28 | - | - | - | - | - | - | - | - | - | 192 |
| 1b.1.1.11 | Biological shield | - | - | - | - | - | - | 66 | 10 | 76 | 76 | - | - | - | - | - | - | - | - | - | 513 |
| 1b.1.1.12 | Steam generators | - | - | - | - | - | - | 253 | 38 | 291 | 291 | - | - | - | - | - | - | - | - | - | 1,967 |
| 1b.1.1.13 | Reinforced concrete | - | - | - | - | - | - | 55 | 8 | 63 | 32 | - | 32 | - | - | - | - | - | - | - | 428 |
| 1b.1.1.14 | Main Turbine | - | - | - | - | - | - | 86 | 13 | 99 | - | - | 99 | - | - | - | - | - | - | - | 667 |
| 1b.1.1.15 | Main Condensers | - | - | - | - | - | - | 86 | 13 | 99 | - | - | 99 | - | - | - | - | - | - | - | 667 |
| 1b.1.1.16 | Auxiliary building | - | - | - | - | - | - | 150 | 23 | 173 | 155 | - | 17 | - | - | - | - | - | - | - | 1,167 |
| 1b.1.1.17 | Reactor building | - | - | - | - | - | - | 150 | 23 | 173 | 155 | - | 17 | - | - | - | - | - | - | - | 1,167 |
| 1b.1.1 | Total | - | - | - | - | - | - | 1,827 | 274 | 2,101 | 1,706 | - | 395 | - | - | - | - | - | - | - | 14,215 |
| 1b.1.2 | Decon primary loop | 572 | - | - | - | - | - | - | 286 | 859 | 859 | - | - | - | - | - | - | - | - | 1,067 | - |
| 1b.1 | Subtotal Period 1b Activity Costs | 572 | - | - | - | - | - | 1,827 | 560 | 2,959 | 2,564 | - | 395 | - | - | - | - | - | - | 1,067 | 14,215 |
| Period 1b Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 1b.2.1 | Site Characterization | - | - | - | - | - | - | 1,505 | 451 | 1,956 | 1,956 | - | - | - | - | - | - | - | - | 8,988 | 3,563 |
| 1b.2.2 | Mixed/Hazardous Waste | - | - | 353 | 94 | 178 | - | - | 76 | 702 | 702 | - | - | 6,132 | - | - | - | - | 351,977 | 2,348 | - |
| 1b.2.3 | Asbestos Abatement | - | 2,526 | 3 | 150 | - | 1,369 | - | 996 | 5,044 | 5,044 | - | - | - | 12,843 | - | - | - | 166,959 | 20,907 | - |
| 1b.2 | Subtotal Period 1b Additional Costs | - | 2,526 | 356 | 244 | 178 | 1,369 | 1,505 | 1,524 | 7,702 | 7,702 | - | - | 6,132 | 12,843 | - | - | - | 518,936 | 32,243 | 3,563 |
| Period 1b Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 1b.3.1 | Decon equipment | 1,055 | - | - | - | - | - | - | 158 | 1,213 | 1,213 | - | - | - | - | - | - | - | - | - | - |
| 1b.3.2 | DOC staff relocation expenses | - | - | - | - | - | - | 1,264 | 190 | 1,454 | 1,454 | - | - | - | - | - | - | - | - | - | - |
| 1b.3.3 | Process decommissioning water waste | 25 | - | 16 | 29 | - | 66 | - | 35 | 172 | 172 | - | - | - | 152 | - | - | - | 9,127 | 30 | - |
| 1b.3.4 | Process decommissioning chemical flush waste | 2 | - | 61 | 199 | - | 3,889 | - | 1,009 | 5,159 | 5,159 | - | - | - | - | - | - | - | 62,689 | 110 | - |
| 1b.3.5 | Small tool allowance | - | 36 | - | - | - | - | - | 5 | 42 | 42 | - | - | - | - | - | - | - | - | - | - |
| 1b.3.6 | Pipe cutting equipment | - | 1,200 | - | - | - | - | - | 180 | 1,380 | 1,380 | - | - | - | - | - | - | - | - | - | - |
| 1b.3.7 | Decon rig | 2,104 | - | - | - | - | - | - | 316 | 2,419 | 2,419 | - | - | - | - | - | - | - | - | - | - |
| 1b.3.8 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 399 | 60 | 459 | - | 459 | - | - | - | - | - | - | - | - | - |
| 1b.3.9 | Retention and Severance | - | - | - | - | - | - | 4,017 | 603 | 4,620 | 4,620 | - | - | - | - | - | - | - | - | - | - |
| 1b.3.10 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 623 | - | 623 | - | 623 | - | - | - | - | - | - | - | - | - |
| 1b.3 | Subtotal Period 1b Collateral Costs | 3,185 | 1,236 | 77 | 228 | - | 3,955 | 6,303 | 2,555 | 17,540 | 16,458 | 1,082 | - | - | 152 | 588 | - | - | 71,815 | 140 | - |
| Period 1b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 1b.4.1 | Decon supplies | 38 | - | - | - | - | - | - | 9 | 47 | 47 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.2 | Insurance | - | - | - | - | - | - | 828 | 83 | 910 | 910 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.3 | Property taxes | - | - | - | - | - | - | 1,713 | 171 | 1,884 | 1,884 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.4 | Health physics supplies | - | 449 | - | - | - | - | - | 112 | 561 | 561 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.5 | Heavy equipment rental | - | 375 | - | - | - | - | - | 56 | 432 | 432 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.6 | Disposal of DAW generated | - | - | 6 | 3 | - | 27 | - | 8 | 43 | 43 | - | - | - | 324 | - | - | - | 6,473 | 11 | - |
| 1b.4.7 | Plant energy budget | - | - | - | - | - | - | 1,617 | 243 | 1,859 | 1,859 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.8 | NRC Fees | - | - | - | - | - | - | 196 | 20 | 216 | 216 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.9 | Emergency Planning Fees | - | - | - | - | - | - | 1,084 | 108 | 1,193 | - | 1,193 | - | - | - | - | - | - | - | - | - |
| 1b.4.10 | Fixed Overhead | - | - | - | - | - | - | 718 | 108 | 826 | 826 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.11 | Spent Fuel Pool O&M | - | - | - | - | - | - | 211 | 32 | 242 | - | 242 | - | - | - | - | - | - | - | - | - |
| 1b.4.12 | ISFSI Operating Costs | - | - | - | - | - | - | 28 | 4 | 32 | - | 32 | - | - | - | - | - | - | - | - | - |
| 1b.4.13 | Railroad Track Maintenance | - | - | - | - | - | - | 31 | 5 | 36 | 36 | - | - | - | - | - | - | - | - | - | - |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table D-2
Prairie Island DECON Unit 2
DECON Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|--|---|--------------|--------------|-----------------|-----------------|---------------------------|---------------------|----------------|-------------------|----------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| Period 1b Period-Dependent Costs (continued) | | | | | | | | | | | | | | | | | | | | | |
| 1b.4.14 | Security Staff Cost | - | - | - | - | - | - | 4,153 | 623 | 4,775 | 4,775 | - | - | - | - | - | - | - | - | - | 61,192 |
| 1b.4.15 | DOC Staff Cost | - | - | - | - | - | - | 4,182 | 627 | 4,810 | 4,810 | - | - | - | - | - | - | - | - | - | 46,672 |
| 1b.4.16 | Utility Staff Cost | - | - | - | - | - | - | 10,811 | 1,622 | 12,432 | 12,432 | - | - | - | - | - | - | - | - | - | 172,167 |
| 1b.4 | Subtotal Period 1b Period-Dependent Costs | 38 | 825 | 6 | 3 | - | 27 | 25,571 | 3,830 | 30,299 | 28,832 | 1,467 | - | - | 324 | - | - | - | 6,473 | 11 | 280,031 |
| 1b.0 | TOTAL PERIOD 1b COST | 3,795 | 4,586 | 440 | 475 | 178 | 5,351 | 35,206 | 8,470 | 58,501 | 55,557 | 2,549 | 395 | 6,132 | 13,319 | 588 | - | - | 597,225 | 33,460 | 297,808 |
| PERIOD 1 TOTALS | | 3,795 | 5,917 | 451 | 479 | 178 | 5,398 | 106,531 | 18,847 | 141,595 | 132,646 | 8,269 | 681 | 6,132 | 13,884 | 588 | - | - | 608,524 | 33,478 | 799,228 |
| PERIOD 2a - Large Component Removal | | | | | | | | | | | | | | | | | | | | | |
| Period 2a Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| Nuclear Steam Supply System Removal | | | | | | | | | | | | | | | | | | | | | |
| 2a.1.1.1 | Reactor Coolant Piping | 54 | 47 | 10 | 18 | - | 187 | - | 89 | 406 | 406 | - | - | - | 508 | - | - | - | 35,411 | 1,421 | - |
| 2a.1.1.2 | Pressurizer Relief Tank | 24 | 21 | 6 | 12 | - | 125 | - | 51 | 238 | 238 | - | - | - | 338 | - | - | - | 23,594 | 630 | - |
| 2a.1.1.3 | Reactor Coolant Pumps & Motors | 57 | 68 | 110 | 93 | - | 463 | - | 186 | 977 | 977 | - | - | - | 2,332 | - | - | - | 295,800 | 2,049 | 100 |
| 2a.1.1.4 | Pressurizer | - | 77 | 503 | 97 | - | 776 | - | 278 | 1,732 | 1,732 | - | - | - | 2,196 | - | - | - | 185,015 | 1,666 | 938 |
| 2a.1.1.5 | Steam Generators | - | 3,307 | 2,269 | 1,770 | 2,409 | 4,001 | - | 2,681 | 16,437 | 16,437 | - | - | 18,672 | 11,316 | - | - | - | 1,689,435 | 11,613 | 2,875 |
| 2a.1.1.6 | CRDMs/ICIs/Service Structure Removal | 302 | 281 | 218 | 66 | - | 938 | - | 488 | 2,294 | 2,294 | - | - | - | 4,797 | - | - | - | 177,400 | 8,104 | - |
| 2a.1.1.7 | Reactor Vessel Internals | 82 | 4,861 | 13,621 | 929 | - | 9,015 | 307 | 11,878 | 40,693 | 40,693 | - | - | - | 501 | 125 | 673 | - | 164,987 | 25,123 | 1,163 |
| 2a.1.1.8 | Reactor Vessel | 94 | 6,046 | 2,028 | 728 | - | 2,975 | 307 | 6,804 | 18,982 | 18,982 | - | - | - | 8,073 | - | - | - | 576,524 | 25,123 | 1,163 |
| 2a.1.1 | Totals | 613 | 14,709 | 18,764 | 3,714 | 2,409 | 18,480 | 614 | 22,455 | 81,759 | 81,759 | - | - | 18,672 | 30,062 | 125 | 673 | - | 3,148,166 | 75,729 | 6,240 |
| Removal of Major Equipment | | | | | | | | | | | | | | | | | | | | | |
| 2a.1.2 | Main Turbine/Generator | - | 331 | 172 | 64 | 527 | 377 | - | 283 | 1,752 | 1,752 | - | - | 2,131 | 1,187 | - | - | - | 203,265 | 4,667 | - |
| 2a.1.3 | Main Condensers | - | 2,801 | 109 | 62 | 705 | 533 | - | 960 | 5,170 | 5,170 | - | - | 3,800 | 1,587 | - | - | - | 271,824 | 39,151 | - |
| Cascading Costs from Clean Building Demolition | | | | | | | | | | | | | | | | | | | | | |
| 2a.1.4.1 | Reactor | - | 794 | - | - | - | - | - | 119 | 913 | 913 | - | - | - | - | - | - | - | - | 7,589 | - |
| 2a.1.4.2 | Auxiliary | - | 221 | - | - | - | - | - | 33 | 254 | 254 | - | - | - | - | - | - | - | - | 1,309 | - |
| 2a.1.4.3 | Radwaste | - | 9 | - | - | - | - | - | 1 | 10 | 10 | - | - | - | - | - | - | - | - | 65 | - |
| 2a.1.4 | Totals | - | 1,023 | - | - | - | - | - | 154 | 1,177 | 1,177 | - | - | - | - | - | - | - | - | 8,963 | - |
| Disposal of Plant Systems | | | | | | | | | | | | | | | | | | | | | |
| 2a.1.5.1 | Admin Bldg Ventilation | - | 6 | - | - | - | - | - | 1 | 7 | - | - | 7 | - | - | - | - | - | - | 90 | - |
| 2a.1.5.2 | Air Removal | - | 29 | - | - | - | - | - | 4 | 33 | - | - | 33 | - | - | - | - | - | - | 422 | - |
| 2a.1.5.3 | Auxiliary Feedwater | - | 46 | - | - | - | - | - | 7 | 53 | - | - | 53 | - | - | - | - | - | - | 676 | - |
| 2a.1.5.4 | Auxiliary Feedwater - RCA | - | 38 | 0 | 1 | 30 | - | - | 14 | 84 | 84 | - | - | 178 | - | - | - | - | 7,214 | 486 | - |
| 2a.1.5.5 | Bleed Steam | - | 90 | - | - | - | - | - | 13 | 103 | - | - | 103 | - | - | - | - | - | - | 1,331 | - |
| 2a.1.5.6 | Caustic Addition - RCA | - | 40 | 0 | 2 | 40 | - | - | 16 | 99 | 99 | - | - | 240 | - | - | - | - | 9,761 | 468 | - |
| 2a.1.5.7 | Chemical Feed | - | 17 | - | - | - | - | - | 3 | 20 | - | - | 20 | - | - | - | - | - | - | 261 | - |
| 2a.1.5.8 | Chemical Feed - RCA | - | 3 | 0 | 0 | 3 | - | - | 1 | 7 | 7 | - | - | 16 | - | - | - | - | 634 | 31 | - |
| 2a.1.5.9 | Circulating Water | - | 27 | - | - | - | - | - | 4 | 32 | - | - | 32 | - | - | - | - | - | - | 401 | - |
| 2a.1.5.10 | Condensate | - | 525 | - | - | - | - | - | 79 | 603 | - | - | 603 | - | - | - | - | - | - | 7,537 | - |
| 2a.1.5.11 | Condensate Polishing | - | 208 | - | - | - | - | - | 31 | 239 | - | - | 239 | - | - | - | - | - | - | 2,987 | - |
| 2a.1.5.12 | Condensate Polishing - RCA | - | 38 | 1 | 4 | 81 | - | - | 22 | 145 | 145 | - | - | 483 | - | - | - | - | 19,616 | 493 | - |
| 2a.1.5.13 | Electro-Hydraulic | - | 10 | - | - | - | - | - | 1 | 11 | - | - | 11 | - | - | - | - | - | - | 143 | - |
| 2a.1.5.14 | External Circulating Water | - | 26 | - | - | - | - | - | 4 | 30 | - | - | 30 | - | - | - | - | - | - | 385 | - |
| 2a.1.5.15 | External Circulating Water - RCA | - | 72 | 1 | 5 | 121 | - | - | 37 | 237 | 237 | - | - | 721 | - | - | - | - | 29,284 | 938 | - |
| 2a.1.5.16 | Feedwater | - | 127 | - | - | - | - | - | 19 | 146 | - | - | 146 | - | - | - | - | - | - | 1,840 | - |
| 2a.1.5.17 | Feedwater - RCA | - | 248 | 8 | 31 | 694 | - | - | 171 | 1,152 | 1,152 | - | - | 4,147 | - | - | - | - | 168,414 | 3,377 | - |
| 2a.1.5.18 | Gland Seal | - | 34 | - | - | - | - | - | 5 | 39 | - | - | 39 | - | - | - | - | - | - | 504 | - |
| 2a.1.5.19 | Heater Drain | - | 384 | - | - | - | - | - | 58 | 441 | - | - | 441 | - | - | - | - | - | - | 5,638 | - |
| 2a.1.5.20 | Hypobromous Acid Feed | - | 6 | - | - | - | - | - | 1 | 7 | - | - | 7 | - | - | - | - | - | - | 86 | - |
| 2a.1.5.21 | Hypobromous Acid Feed - RCA | - | 1 | 0 | 0 | 0 | - | - | 0 | 2 | 2 | - | - | 2 | - | - | - | - | 100 | 12 | - |
| 2a.1.5.22 | Internal Circ Water & CDSR | - | 25 | - | - | - | - | - | 4 | 29 | - | - | 29 | - | - | - | - | - | - | 366 | - |
| 2a.1.5.23 | Main Gen/Exciter/Transformer | - | 0 | - | - | - | - | - | 0 | 0 | - | - | 0 | - | - | - | - | - | - | 5 | - |
| 2a.1.5.24 | Main Steam | - | 101 | - | - | - | - | - | 15 | 116 | - | - | 116 | - | - | - | - | - | - | 1,482 | - |
| 2a.1.5.25 | Main Steam - RCA | - | 380 | 11 | 38 | 864 | - | - | 231 | 1,525 | 1,525 | - | - | 5,166 | - | - | - | - | 209,799 | 5,146 | - |
| 2a.1.5.26 | Repairable Spare Snubbers | - | 6 | 0 | 0 | 2 | - | - | 2 | 10 | 10 | - | - | 12 | - | - | - | - | 490 | 82 | - |
| 2a.1.5.27 | Steam Exclusion | - | 2 | - | - | - | - | - | 0 | 2 | - | - | 2 | - | - | - | - | - | - | 32 | - |
| 2a.1.5.28 | Steam Exclusion - RCA | - | 4 | 0 | 0 | 4 | - | - | 2 | 10 | 10 | - | - | 24 | - | - | - | - | 966 | 47 | - |
| 2a.1.5.29 | Steam Generator Blowdown | - | 416 | 21 | 27 | 319 | 215 | - | 212 | 1,210 | 1,210 | - | - | 1,906 | 631 | - | - | - | 118,130 | 5,778 | - |
| 2a.1.5.30 | Steam Generators | - | 5 | - | - | - | - | - | 1 | 6 | - | - | 6 | - | - | - | - | - | - | 75 | - |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table D-2
Prairie Island DECON Unit 2
DECON Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | | |
|---|--|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|---------|---------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | | |
| Disposal of Plant Systems (continued) | | | | | | | | | | | | | | | | | | | | | | | |
| 2a.1.5.31 | Turbine & Moisture Separators | - | 377 | - | - | - | - | - | 57 | 434 | - | - | 434 | - | - | - | - | - | - | - | 5,472 | - | |
| 2a.1.5.32 | Turbine Oil Purification | - | 53 | - | - | - | - | - | 8 | 61 | - | - | 61 | - | - | - | - | - | - | - | 757 | - | |
| 2a.1.5.33 | Water Treatment | - | 453 | - | - | - | - | - | 68 | 521 | - | - | 521 | - | - | - | - | - | - | - | 6,677 | - | |
| 2a.1.5.34 | Water Treatment - RCA | - | 20 | 0 | 1 | 19 | - | - | 8 | 49 | 49 | - | - | 115 | - | - | - | - | - | - | 4,652 | 252 | |
| 2a.1.5 | Totals | - | 3,817 | 43 | 108 | 2,177 | 215 | - | 1,100 | 7,461 | 4,528 | - | 2,933 | 13,010 | 631 | - | - | - | - | - | 569,060 | 54,280 | |
| 2a.1.6 | Scaffolding in support of decommissioning | - | 3,020 | 22 | 10 | 188 | 30 | - | 794 | 4,064 | 4,064 | - | - | 1,012 | 89 | - | - | - | - | - | 51,216 | 26,270 | |
| 2a.1 | Subtotal Period 2a Activity Costs | 613 | 25,702 | 19,110 | 3,959 | 6,005 | 19,635 | 614 | 25,745 | 101,384 | 98,450 | - | 2,933 | 38,625 | 33,556 | 125 | 673 | - | - | - | 4,243,531 | 209,060 | 6,240 |
| Period 2a Additional Costs | | | | | | | | | | | | | | | | | | | | | | | |
| 2a.2.1 | Retired RPV Upper Internals Package | - | 257 | 387 | 217 | - | 1,394 | - | 1,041 | 3,296 | 3,296 | - | - | - | 376 | 112 | - | - | - | - | 50,164 | 3,333 | 133 |
| 2a.2 | Subtotal Period 2a Additional Costs | - | 257 | 387 | 217 | - | 1,394 | - | 1,041 | 3,296 | 3,296 | - | - | - | 376 | 112 | - | - | - | - | 50,164 | 3,333 | 133 |
| Period 2a Collateral Costs | | | | | | | | | | | | | | | | | | | | | | | |
| 2a.3.1 | Process decommissioning water waste | 49 | - | 33 | 60 | - | 134 | - | 70 | 347 | 347 | - | - | - | 308 | - | - | - | - | - | 18,487 | 60 | - |
| 2a.3.2 | Process decommissioning chemical flush waste | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 2a.3.3 | Small tool allowance | - | 269 | - | - | - | - | - | 40 | 309 | 278 | - | 31 | - | - | - | - | - | - | - | - | - | - |
| 2a.3.4 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 8,593 | 1,289 | 9,882 | - | 9,882 | - | - | - | - | - | - | - | - | - | - | - |
| 2a.3.5 | Retention and Severance | - | - | - | - | - | - | 8,215 | 1,232 | 9,447 | 9,447 | - | - | - | - | - | - | - | - | - | - | - | - |
| 2a.3.6 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 1,780 | - | 1,780 | - | 1,780 | - | - | - | - | - | - | - | - | - | - | - |
| 2a.3 | Subtotal Period 2a Collateral Costs | 49 | 269 | 33 | 60 | - | 134 | 18,588 | 2,632 | 21,765 | 10,072 | 11,662 | 31 | - | 308 | - | - | - | - | - | 18,487 | 60 | - |
| Period 2a Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | | |
| 2a.4.1 | Decon supplies | 107 | - | - | - | - | - | - | 27 | 134 | 134 | - | - | - | - | - | - | - | - | - | - | - | - |
| 2a.4.2 | Insurance | - | - | - | - | - | - | 690 | 69 | 759 | 759 | - | - | - | - | - | - | - | - | - | - | - | - |
| 2a.4.3 | Property taxes | - | - | - | - | - | - | 4,548 | 455 | 5,002 | 5,002 | - | - | - | - | - | - | - | - | - | - | - | - |
| 2a.4.4 | Health physics supplies | - | 2,103 | - | - | - | - | - | 526 | 2,629 | 2,629 | - | - | - | - | - | - | - | - | - | - | - | - |
| 2a.4.5 | Heavy equipment rental | - | 3,565 | - | - | - | - | - | 535 | 4,100 | 4,100 | - | - | - | - | - | - | - | - | - | - | - | - |
| 2a.4.6 | Disposal of DAW generated | - | - | 86 | 35 | - | 358 | - | 103 | 582 | 582 | - | - | - | 4,345 | - | - | - | - | - | 86,891 | 142 | - |
| 2a.4.7 | Plant energy budget | - | - | - | - | - | - | 2,194 | 329 | 2,523 | 2,523 | - | - | - | - | - | - | - | - | - | - | - | - |
| 2a.4.8 | NRC Fees | - | - | - | - | - | - | 526 | 53 | 578 | 578 | - | - | - | - | - | - | - | - | - | - | - | - |
| 2a.4.9 | Emergency Planning Fees | - | - | - | - | - | - | 2,647 | 265 | 2,912 | - | 2,912 | - | - | - | - | - | - | - | - | - | - | - |
| 2a.4.10 | Fixed Overhead | - | - | - | - | - | - | 1,695 | 254 | 1,949 | 1,949 | - | - | - | - | - | - | - | - | - | - | - | - |
| 2a.4.11 | Spent Fuel Pool O&M | - | - | - | - | - | - | 602 | 90 | 692 | - | 692 | - | - | - | - | - | - | - | - | - | - | - |
| 2a.4.12 | ISFSI Operating Costs | - | - | - | - | - | - | 80 | 12 | 92 | - | 92 | - | - | - | - | - | - | - | - | - | - | - |
| 2a.4.13 | Railroad Track Maintenance | - | - | - | - | - | - | 318 | 48 | 366 | 366 | - | - | - | - | - | - | - | - | - | - | - | - |
| 2a.4.14 | Remedial Actions Surveys | - | - | - | - | - | - | 1,596 | 239 | 1,835 | 1,835 | - | - | - | - | - | - | - | - | - | - | - | - |
| 2a.4.15 | Security Staff Cost | - | - | - | - | - | - | 10,900 | 1,635 | 12,534 | 12,534 | - | - | - | - | - | - | - | - | - | - | - | 160,018 |
| 2a.4.16 | DOC Staff Cost | - | - | - | - | - | - | 20,663 | 3,099 | 23,763 | 23,763 | - | - | - | - | - | - | - | - | - | - | - | 225,210 |
| 2a.4.17 | Utility Staff Cost | - | - | - | - | - | - | 27,056 | 4,058 | 31,115 | 31,115 | - | - | - | - | - | - | - | - | - | - | - | 419,049 |
| 2a.4 | Subtotal Period 2a Period-Dependent Costs | 107 | 5,668 | 86 | 35 | - | 358 | 73,514 | 11,797 | 91,565 | 87,870 | 3,696 | - | - | 4,345 | - | - | - | - | - | 86,891 | 142 | 804,276 |
| 2a.0 | TOTAL PERIOD 2a COST | 770 | 31,895 | 19,616 | 4,270 | 6,005 | 21,522 | 92,716 | 41,215 | 218,009 | 199,687 | 15,358 | 2,964 | 38,625 | 38,584 | 237 | 673 | - | - | - | 4,399,073 | 212,595 | 810,649 |
| PERIOD 2b - Site Decontamination | | | | | | | | | | | | | | | | | | | | | | | |
| Period 2b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | | |
| Disposal of Plant Systems | | | | | | | | | | | | | | | | | | | | | | | |
| 2b.1.1.1 | ADT & Misc Ventilation | - | 25 | 1 | 1 | 26 | 3 | - | 11 | 66 | 66 | - | - | 153 | 9 | - | - | - | - | - | 6,803 | 363 | - |
| 2b.1.1.2 | Aux Bldg Normal Ventilation | - | 69 | 2 | 6 | 116 | 13 | - | 39 | 246 | 246 | - | - | 692 | 39 | - | - | - | - | - | 30,595 | 1,013 | - |
| 2b.1.1.3 | Aux Bldg Special Ventilation | - | 14 | 0 | 1 | 12 | 2 | - | 6 | 34 | 34 | - | - | 70 | 6 | - | - | - | - | - | 3,234 | 197 | - |
| 2b.1.1.4 | Battery Rm Special Ventilation | - | 2 | - | - | - | - | - | 0 | 2 | - | - | 2 | - | - | - | - | - | - | - | - | 24 | - |
| 2b.1.1.5 | Boron Recycle | 0 | 4 | 0 | 0 | 0 | 3 | - | 2 | 10 | 10 | - | - | 3 | 9 | - | - | - | - | - | 700 | 50 | - |
| 2b.1.1.6 | Chemical & Volume Control | 749 | 942 | 62 | 57 | 394 | 677 | - | 853 | 3,736 | 3,736 | - | - | 2,356 | 1,977 | - | - | - | - | - | 223,753 | 23,197 | - |
| 2b.1.1.7 | Cold Chemical Lab Ventilation | - | 1 | - | - | - | - | - | 0 | 1 | - | - | 1 | - | - | - | - | - | - | - | - | 9 | - |
| 2b.1.1.8 | Component Cooling - RCA | - | 647 | 25 | 88 | 2,007 | - | - | 479 | 3,246 | 3,246 | - | - | 11,996 | - | - | - | - | - | - | 487,169 | 8,583 | - |
| 2b.1.1.9 | Containment Cooling | - | 35 | - | - | - | - | - | 5 | 40 | - | - | 40 | - | - | - | - | - | - | - | - | 502 | - |
| 2b.1.1.10 | Containment Cooling - RCA | - | 302 | 6 | 20 | 459 | - | - | 148 | 934 | 934 | - | - | 2,743 | - | - | - | - | - | - | 111,390 | 3,949 | - |
| 2b.1.1.11 | Containment Hydrogen Control - RCA | - | 36 | 0 | 1 | 24 | - | - | 13 | 74 | 74 | - | - | 141 | - | - | - | - | - | - | 5,742 | 494 | - |
| 2b.1.1.12 | Containment Spray - RCA | - | 194 | 3 | 11 | 243 | - | - | 87 | 538 | 538 | - | - | 1,453 | - | - | - | - | - | - | 59,019 | 2,617 | - |
| 2b.1.1.13 | Containment Ventilation | - | 235 | 23 | 49 | 790 | 243 | - | 248 | 1,587 | 1,587 | - | - | 4,721 | 722 | - | - | - | - | - | 237,643 | 3,375 | - |
| 2b.1.1.14 | Control/Relay/Cmptr Rm Vent | - | 31 | 1 | 2 | 44 | 7 | - | 17 | 102 | 102 | - | - | 260 | 20 | - | - | - | - | - | 11,878 | 454 | - |
| 2b.1.1.15 | Cooling Water | - | 159 | - | - | - | - | - | 24 | 183 | - | - | 183 | - | - | - | - | - | - | - | - | 2,344 | - |
| 2b.1.1.16 | Cooling Water - RCA | - | 476 | 17 | 62 | 1,412 | - | - | 342 | 2,310 | 2,310 | - | - | 8,442 | - | - | - | - | - | - | 342,822 | 6,311 | - |
| 2b.1.1.17 | Cranes/Hoists/Elevators - RCA | - | 3 | 0 | 1 | 17 | - | - | 4 | 25 | 25 | - | - | 103 | - | - | - | - | - | - | 4,184 | 48 | - |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table D-2
Prairie Island DECON Unit 2
DECON Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|---------------------------------------|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|---------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| Disposal of Plant Systems (continued) | | | | | | | | | | | | | | | | | | | | | | |
| 2b.1.1.18 | D3 Emergency Diesel | - | 10 | - | - | - | - | - | 2 | 12 | - | - | 12 | - | - | - | - | - | - | - | 141 | - |
| 2b.1.1.19 | D4 Emergency Diesel | - | 10 | - | - | - | - | - | 2 | 12 | - | - | 12 | - | - | - | - | - | - | - | 141 | - |
| 2b.1.1.20 | D5 Emergency Diesel | - | 0 | - | - | - | - | - | 0 | 0 | - | - | 0 | - | - | - | - | - | - | - | 5 | - |
| 2b.1.1.21 | Electrical - Clean | - | 1,714 | - | - | - | - | - | 257 | 1,972 | - | - | 1,972 | - | - | - | - | - | - | - | 24,276 | - |
| 2b.1.1.22 | Electrical - Contaminated | - | 475 | 5 | 16 | 334 | 25 | - | 178 | 1,034 | 1,034 | - | - | 1,997 | 75 | - | - | - | - | - | 85,887 | 6,503 |
| 2b.1.1.23 | Electrical - Decontaminated | - | 2,955 | 38 | 138 | 3,138 | - | - | 1,234 | 7,503 | 7,503 | - | - | 18,753 | - | - | - | - | - | - | 761,569 | 38,423 |
| 2b.1.1.24 | Filter Rm Ventilation | - | 5 | 0 | 0 | 4 | 0 | - | 2 | 11 | 11 | - | - | 24 | 1 | - | - | - | - | - | 1,017 | 69 |
| 2b.1.1.25 | Fire Protection & Detection | - | 204 | - | - | - | - | - | 31 | 235 | - | - | 235 | - | - | - | - | - | - | - | - | 3,009 |
| 2b.1.1.26 | Fire Protection & Detection - RCA | - | 246 | 4 | 13 | 306 | - | - | 110 | 679 | 679 | - | - | 1,828 | - | - | - | - | - | - | 74,245 | 3,134 |
| 2b.1.1.27 | Fuel Handling | - | 74 | 1 | 2 | 34 | 17 | - | 28 | 156 | 156 | - | - | 200 | 49 | - | - | - | - | - | 11,273 | 1,101 |
| 2b.1.1.28 | Fuel Oil | - | 1 | - | - | - | - | - | 0 | 1 | - | - | 1 | - | - | - | - | - | - | - | - | 9 |
| 2b.1.1.29 | HVAC - Clean | - | 151 | - | - | - | - | - | 23 | 174 | - | - | 174 | - | - | - | - | - | - | - | - | 2,373 |
| 2b.1.1.30 | HVAC - Contaminated | - | 1,231 | 29 | 87 | 1,798 | 136 | - | 627 | 3,908 | 3,908 | - | - | 10,745 | 405 | - | - | - | - | - | 462,103 | 16,579 |
| 2b.1.1.31 | Heating | - | 322 | - | - | - | - | - | 48 | 370 | - | - | 370 | - | - | - | - | - | - | - | - | 4,804 |
| 2b.1.1.32 | Heating - RCA | - | 337 | 4 | 14 | 319 | - | - | 135 | 809 | 809 | - | - | 1,907 | - | - | - | - | - | - | 77,458 | 4,086 |
| 2b.1.1.33 | Hot Lab & Sample Rm Ventilation | - | 20 | 0 | 1 | 18 | 1 | - | 8 | 48 | 48 | - | - | 107 | 4 | - | - | - | - | - | 4,622 | 285 |
| 2b.1.1.34 | Incore Instrumentation | 0 | 30 | 1 | 2 | 10 | 20 | - | 14 | 77 | 77 | - | - | 60 | 58 | - | - | - | - | - | 6,143 | 458 |
| 2b.1.1.35 | Misc Drains & Vents | - | 234 | 12 | 12 | 77 | 145 | - | 109 | 590 | 590 | - | - | 458 | 426 | - | - | - | - | - | 46,079 | 3,180 |
| 2b.1.1.36 | Misc Lab & Service Areas Vent | - | 129 | 8 | 8 | 62 | 84 | - | 65 | 356 | 356 | - | - | 370 | 244 | - | - | - | - | - | 30,899 | 1,713 |
| 2b.1.1.37 | Miscellaneous Gas | - | 72 | - | - | - | - | - | 11 | 83 | - | - | 83 | - | - | - | - | - | - | - | - | 1,073 |
| 2b.1.1.38 | Miscellaneous Gas - RCA | - | 134 | 1 | 4 | 100 | - | - | 49 | 289 | 289 | - | - | 600 | - | - | - | - | - | - | 24,378 | 1,636 |
| 2b.1.1.39 | Radiation Monitoring | - | 7 | - | - | - | - | - | 1 | 9 | - | - | 9 | - | - | - | - | - | - | - | - | 111 |
| 2b.1.1.40 | Radiation Monitoring - RCA | - | 65 | 1 | 2 | 53 | - | - | 25 | 145 | 145 | - | - | 316 | - | - | - | - | - | - | 12,826 | 782 |
| 2b.1.1.41 | Reactor Coolant | 163 | 236 | 20 | 16 | 38 | 249 | - | 213 | 937 | 937 | - | - | 229 | 730 | - | - | - | - | - | 56,440 | 5,517 |
| 2b.1.1.42 | Reactor Hot Sampling | 140 | 126 | 11 | 7 | 9 | 108 | - | 132 | 533 | 533 | - | - | 54 | 312 | - | - | - | - | - | 22,678 | 3,686 |
| 2b.1.1.43 | Reactor Makeup | - | 41 | - | - | - | - | - | 6 | 47 | - | - | 47 | - | - | - | - | - | - | - | - | 583 |
| 2b.1.1.44 | Reactor Makeup - RCA | - | 4 | 0 | 0 | 5 | - | - | 2 | 11 | 11 | - | - | 28 | - | - | - | - | - | - | 1,148 | 47 |
| 2b.1.1.45 | Reactor Vessel | 9 | 18 | 1 | 0 | 4 | 5 | - | 11 | 47 | 47 | - | - | 22 | 14 | - | - | - | - | - | 1,816 | 385 |
| 2b.1.1.46 | Residual Heat Removal | 348 | 393 | 84 | 86 | 477 | 1,102 | - | 641 | 3,132 | 3,132 | - | - | 2,853 | 3,244 | - | - | - | - | - | 324,232 | 7,112 |
| 2b.1.1.47 | Safeguards Chilled Water | - | 5 | - | - | - | - | - | 1 | 6 | - | - | 6 | - | - | - | - | - | - | - | - | 75 |
| 2b.1.1.48 | Safety Injection | - | 874 | 42 | 72 | 1,117 | 395 | - | 500 | 3,000 | 3,000 | - | - | 6,676 | 1,161 | - | - | - | - | - | 345,708 | 12,284 |
| 2b.1.1.49 | Sampling | - | 52 | 3 | 2 | 6 | 32 | - | 23 | 119 | 119 | - | - | 37 | 93 | - | - | - | - | - | 7,628 | 714 |
| 2b.1.1.50 | Service Bldg & New Cmpt Vent | - | 0 | - | - | - | - | - | 0 | 0 | - | - | 0 | - | - | - | - | - | - | - | - | 6 |
| 2b.1.1.51 | Shield Bldg Ventilation | - | 120 | 13 | 25 | 339 | 163 | - | 127 | 787 | 787 | - | - | 2,028 | 484 | - | - | - | - | - | 113,139 | 1,743 |
| 2b.1.1.52 | Station & Instrument Air | - | 161 | - | - | - | - | - | 24 | 185 | - | - | 185 | - | - | - | - | - | - | - | - | 2,424 |
| 2b.1.1.53 | Station & Instrument Air - RCA | - | 299 | 3 | 12 | 272 | - | - | 118 | 704 | 704 | - | - | 1,625 | - | - | - | - | - | - | 65,986 | 3,638 |
| 2b.1.1.54 | Turbine Bldg Traps & Drains | - | 30 | - | - | - | - | - | 5 | 35 | - | - | 35 | - | - | - | - | - | - | - | - | 462 |
| 2b.1.1.55 | Turbine Bldg Traps & Drains - RCA | - | 30 | 0 | 1 | 30 | - | - | 12 | 73 | 73 | - | - | 180 | - | - | - | - | - | - | 7,321 | 344 |
| 2b.1.1.56 | Turbine Bldg Ventilation | - | 46 | - | - | - | - | - | 7 | 53 | - | - | 53 | - | - | - | - | - | - | - | - | 655 |
| 2b.1.1.57 | Unit Coolers | - | 23 | - | - | - | - | - | 3 | 26 | - | - | 26 | - | - | - | - | - | - | - | - | 332 |
| 2b.1.1.58 | Unit Coolers - RCA | - | 56 | 0 | 2 | 39 | - | - | 20 | 117 | 117 | - | - | 232 | - | - | - | - | - | - | 9,413 | 690 |
| 2b.1.1.59 | Waste Gas Disposal | 553 | 479 | 43 | 45 | 410 | 464 | - | 585 | 2,581 | 2,581 | - | - | 2,453 | 1,358 | - | - | - | - | - | 187,339 | 14,308 |
| 2b.1.1.60 | Waste Liquid Disposal | 1,436 | 1,800 | 116 | 100 | 612 | 1,234 | - | 1,595 | 6,893 | 6,893 | - | - | 3,655 | 3,594 | - | - | - | - | - | 381,754 | 44,485 |
| 2b.1.1.61 | Waste Solid Disposal | 115 | 145 | 12 | 11 | 65 | 134 | - | 140 | 622 | 622 | - | - | 389 | 393 | - | - | - | - | - | 41,177 | 3,481 |
| 2b.1.1 | Totals | 3,515 | 16,542 | 596 | 980 | 15,220 | 5,264 | - | 9,399 | 51,516 | 48,072 | - | 3,444 | 90,963 | 15,429 | - | - | - | - | - | 4,689,210 | 270,390 |
| 2b.1.2 | Scaffolding in support of decommissioning | - | 3,775 | 27 | 13 | 235 | 37 | - | 993 | 5,081 | 5,081 | - | - | 1,265 | 112 | - | - | - | - | - | 64,020 | 32,837 |
| Decontamination of Site Buildings | | | | | | | | | | | | | | | | | | | | | | |
| 2b.1.3.1 | Reactor | 1,215 | 2,808 | 240 | 1,236 | 373 | 13,625 | - | 4,981 | 24,479 | 24,479 | - | - | 2,230 | 83,434 | - | - | - | - | - | 3,633,771 | 50,962 |
| 2b.1.3.2 | Auxiliary | 1,292 | 422 | 23 | 117 | 177 | 648 | - | 960 | 3,639 | 3,639 | - | - | 1,060 | 6,118 | - | - | - | - | - | 332,495 | 23,821 |
| 2b.1.3.3 | Backwash Waste Receiving Tank | - | 28 | 3 | 17 | - | 97 | - | 34 | 179 | 179 | - | - | - | 929 | - | - | - | - | - | 43,896 | 301 |
| 2b.1.3.4 | Drum Transfer & Truck Loading Enclosure | 18 | 9 | 1 | 3 | 3 | 14 | - | 16 | 63 | 63 | - | - | 19 | 135 | - | - | - | - | - | 7,118 | 369 |
| 2b.1.3.5 | LLRW Storage Enclosure | 123 | 54 | 3 | 17 | 6 | 96 | - | 103 | 403 | 403 | - | - | 38 | 920 | - | - | - | - | - | 44,971 | 2,426 |
| 2b.1.3.6 | Radwaste | 55 | 24 | 1 | 8 | 7 | 43 | - | 47 | 185 | 185 | - | - | 42 | 412 | - | - | - | - | - | 21,136 | 1,083 |
| 2b.1.3.7 | Resin Disposal | 16 | 12 | 1 | 3 | 14 | 14 | - | 17 | 76 | 76 | - | - | 83 | 124 | - | - | - | - | - | 9,271 | 383 |
| 2b.1.3 | Totals | 2,720 | 3,357 | 271 | 1,400 | 581 | 14,537 | - | 6,158 | 29,024 | 29,024 | - | - | 3,471 | 92,071 | - | - | - | - | - | 4,092,658 | 79,343 |
| 2b.1.4 | Prepare/submit License Termination Plan | - | - | - | - | - | - | 225 | 34 | 259 | 259 | - | - | - | - | - | - | - | - | - | - | 1,751 |
| 2b.1.5 | Receive NRC approval of termination plan | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - | - |
| 2b.1 | Subtotal Period 2b Activity Costs | 6,235 | 23,674 | 895 | 2,393 | 16,035 | 19,839 | 225 | 16,584 | 85,879 | 82,435 | - | 3,444 | 95,700 | 107,611 | - | - | - | - | - | 8,845,887 | 382,570 |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table D-2
Prairie Island DECON Unit 2
DECON Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| Period 2b Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 2b.2.1 | Operational Equipment | - | - | 11 | 36 | 606 | - | - | 97 | 751 | 751 | - | - | 5,880 | - | - | - | - | 147,000 | 16 | - |
| 2b.2.2 | Excavation of Underground Services | - | 1,175 | - | - | - | - | 225 | 328 | 1,728 | 1,728 | - | - | - | - | - | - | - | - | 7,411 | - |
| 2b.2.3 | Security Modifications | - | - | - | - | - | - | 4,348 | 652 | 5,000 | 5,000 | - | - | - | - | - | - | - | - | - | - |
| 2b.2 | Subtotal Period 2b Additional Costs | - | 1,175 | 11 | 36 | 606 | - | 4,573 | 1,077 | 7,478 | 7,478 | - | - | 5,880 | - | - | - | - | 147,000 | 7,427 | - |
| Period 2b Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 2b.3.1 | Process decommissioning water waste | 166 | - | 113 | 203 | - | 456 | - | 239 | 1,176 | 1,176 | - | - | - | 1,047 | - | - | - | 62,844 | 204 | - |
| 2b.3.2 | Process decommissioning chemical flush waste | 3 | - | 119 | 390 | - | 893 | - | 295 | 1,699 | 1,699 | - | - | - | 1,154 | - | - | - | 122,948 | 216 | - |
| 2b.3.3 | Small tool allowance | - | 446 | - | - | - | - | - | 67 | 513 | 513 | - | - | - | - | - | - | - | - | - | - |
| 2b.3.4 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 49,678 | 7,452 | 57,129 | - | 57,129 | - | - | - | - | - | - | - | - | - |
| 2b.3.5 | Retention and Severance | - | - | - | - | - | - | 2,839 | 426 | 3,265 | 3,265 | - | - | - | - | - | - | - | - | - | - |
| 2b.3.6 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 1,348 | - | 1,348 | - | 1,348 | - | - | - | - | - | - | - | - | - |
| 2b.3 | Subtotal Period 2b Collateral Costs | 169 | 446 | 232 | 592 | - | 1,349 | 53,866 | 8,478 | 65,132 | 6,654 | 58,478 | - | - | 2,201 | - | - | - | 185,792 | 420 | - |
| Period 2b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 2b.4.1 | Decon supplies | 1,219 | - | - | - | - | - | - | 305 | 1,524 | 1,524 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.2 | Insurance | - | - | - | - | - | - | 523 | 52 | 575 | 575 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.3 | Property taxes | - | - | - | - | - | - | 3,075 | 308 | 3,383 | 3,383 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.4 | Health physics supplies | - | 2,866 | - | - | - | - | - | 716 | 3,582 | 3,582 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.5 | Heavy equipment rental | - | 2,774 | - | - | - | - | - | 416 | 3,190 | 3,190 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.6 | Disposal of DAW generated | - | - | 103 | 42 | - | 429 | - | 124 | 698 | 698 | - | - | - | 5,209 | - | - | - | 104,172 | 170 | - |
| 2b.4.7 | Plant energy budget | - | - | - | - | - | - | 1,313 | 197 | 1,509 | 1,509 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.8 | NRC Fees | - | - | - | - | - | - | 398 | 40 | 438 | 438 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.9 | Emergency Planning Fees | - | - | - | - | - | - | 2,006 | 201 | 2,207 | - | 2,207 | - | - | - | - | - | - | - | - | - |
| 2b.4.10 | Fixed Overhead | - | - | - | - | - | - | 1,284 | 193 | 1,477 | 1,477 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.11 | Spent Fuel Pool O&M | - | - | - | - | - | - | 456 | 68 | 524 | - | 524 | - | - | - | - | - | - | - | - | - |
| 2b.4.12 | Liquid Radwaste Processing Equipment/Services | - | - | - | - | - | - | 229 | 34 | 264 | 264 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.13 | ISFSI Operating Costs | - | - | - | - | - | - | 60 | 9 | 69 | - | 69 | - | - | - | - | - | - | - | - | - |
| 2b.4.14 | Railroad Track Maintenance | - | - | - | - | - | - | 67 | 10 | 78 | 78 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.15 | Remedial Actions Surveys | - | - | - | - | - | - | 1,209 | 181 | 1,391 | 1,391 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.16 | Security Staff Cost | - | - | - | - | - | - | 8,259 | 1,239 | 9,497 | 9,497 | - | - | - | - | - | - | - | - | - | 121,244 |
| 2b.4.17 | DOC Staff Cost | - | - | - | - | - | - | 15,117 | 2,268 | 17,385 | 17,385 | - | - | - | - | - | - | - | - | - | 163,904 |
| 2b.4.18 | Utility Staff Cost | - | - | - | - | - | - | 19,642 | 2,946 | 22,588 | 22,588 | - | - | - | - | - | - | - | - | - | 304,233 |
| 2b.4 | Subtotal Period 2b Period-Dependent Costs | 1,219 | 5,640 | 103 | 42 | - | 429 | 53,639 | 9,307 | 70,380 | 67,579 | 2,800 | - | - | 5,209 | - | - | - | 104,172 | 170 | 589,381 |
| 2b.0 | TOTAL PERIOD 2b COST | 7,623 | 30,935 | 1,242 | 3,063 | 16,641 | 21,617 | 112,303 | 35,446 | 228,869 | 164,147 | 61,278 | 3,444 | 101,580 | 115,021 | - | - | - | 9,282,851 | 390,587 | 591,132 |
| PERIOD 2d - Decontamination Following Wet Fuel Storage | | | | | | | | | | | | | | | | | | | | | |
| Period 2d Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| 2d.1.1 | Remove spent fuel racks | 347 | 35 | 86 | 41 | - | 703 | - | 373 | 1,585 | 1,585 | - | - | - | 2,092 | - | - | - | 132,919 | 576 | - |
| Disposal of Plant Systems | | | | | | | | | | | | | | | | | | | | | |
| 2d.1.2.1 | Electrical - Contaminated - Fuel Pool | - | 203 | 2 | 7 | 145 | 11 | - | 77 | 445 | 445 | - | - | 864 | 33 | - | - | - | 37,167 | 2,783 | - |
| 2d.1.2.2 | Electrical - Decontaminated - Fuel Pool | - | 1,269 | 17 | 59 | 1,350 | - | - | 530 | 3,225 | 3,225 | - | - | 8,069 | - | - | - | - | 327,668 | 16,495 | - |
| 2d.1.2.3 | Fire Protection & Detection - RCA Fuel P | - | 37 | 1 | 2 | 48 | - | - | 17 | 105 | 105 | - | - | 286 | - | - | - | - | 11,622 | 476 | - |
| 2d.1.2.4 | HVAC - Contaminated - Fuel Pool | - | 553 | 13 | 39 | 808 | 61 | - | 282 | 1,756 | 1,756 | - | - | 4,828 | 182 | - | - | - | 207,612 | 7,448 | - |
| 2d.1.2.5 | Safeguards Chilled Water - RCA | - | 5 | 0 | 0 | 4 | - | - | 2 | 11 | 11 | - | - | 26 | - | - | - | - | 1,045 | 51 | - |
| 2d.1.2.6 | Spent Fuel Pool Cooling | 32 | 36 | 3 | 2 | 6 | 37 | - | 36 | 152 | 152 | - | - | 39 | 107 | - | - | - | 8,481 | 882 | - |
| 2d.1.2.7 | Spent Fuel Pool Normal Ventilation | - | 27 | 1 | 2 | 44 | 4 | - | 15 | 93 | 93 | - | - | 265 | 12 | - | - | - | 11,505 | 394 | - |
| 2d.1.2 | Totals | 32 | 2,130 | 36 | 112 | 2,405 | 113 | - | 958 | 5,786 | 5,786 | - | - | 14,376 | 333 | - | - | - | 605,100 | 28,530 | - |
| Decontamination of Site Buildings | | | | | | | | | | | | | | | | | | | | | |
| 2d.1.3.1 | Fuel Handling of Aux Building | 1,029 | 1,138 | 13 | 45 | 404 | 195 | - | 916 | 3,741 | 3,741 | - | - | 2,417 | 1,652 | - | - | - | 177,755 | 30,404 | - |
| 2d.1.3 | Totals | 1,029 | 1,138 | 13 | 45 | 404 | 195 | - | 916 | 3,741 | 3,741 | - | - | 2,417 | 1,652 | - | - | - | 177,755 | 30,404 | - |
| 2d.1.4 | Scaffolding in support of decommissioning | - | 755 | 5 | 3 | 47 | 7 | - | 199 | 1,016 | 1,016 | - | - | 253 | 22 | - | - | - | 12,804 | 6,567 | - |
| 2d.1 | Subtotal Period 2d Activity Costs | 1,408 | 4,058 | 141 | 202 | 2,857 | 1,018 | - | 2,445 | 12,128 | 12,128 | - | - | 17,046 | 4,099 | - | - | - | 928,579 | 66,078 | - |
| Period 2d Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 2d.2.1 | License Termination Survey Planning | - | - | - | - | - | - | 1,037 | 311 | 1,348 | 1,348 | - | - | - | - | - | - | - | - | - | 6,240 |
| 2d.2 | Subtotal Period 2d Additional Costs | - | - | - | - | - | - | 1,037 | 311 | 1,348 | 1,348 | - | - | - | - | - | - | - | - | - | 6,240 |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table D-2
Prairie Island DECON Unit 2
DECON Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|---|---------------|---------------|-----------------|-----------------|---------------------------|---------------------|----------------|-------------------|----------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| Period 2d Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 2d.3.1 | Process decommissioning water waste | 45 | - | 31 | 56 | - | 126 | - | 65 | 323 | 323 | - | - | - | 288 | - | - | - | 17,293 | 56 | - |
| 2d.3.2 | Process decommissioning chemical flush waste | 0 | - | 1 | 5 | - | 10 | - | 3 | 20 | 20 | - | - | - | 13 | - | - | - | 1,422 | 2 | - |
| 2d.3.3 | Small tool allowance | - | 83 | - | - | - | - | - | 12 | 95 | 95 | - | - | - | - | - | - | - | - | - | - |
| 2d.3.4 | Decommissioning Equipment Disposition | - | - | 130 | 67 | 1,112 | 178 | - | 234 | 1,722 | 1,722 | - | - | 6,000 | 529 | - | - | - | 303,608 | 147 | - |
| 2d.3.5 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 975 | - | 975 | - | 975 | - | - | - | - | - | - | - | - | - |
| 2d.3 | Subtotal Period 2d Collateral Costs | 45 | 83 | 162 | 128 | 1,112 | 314 | 975 | 316 | 3,135 | 2,160 | 975 | - | 6,000 | 831 | - | - | - | 322,324 | 206 | - |
| Period 2d Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 2d.4.1 | Decon supplies | 236 | - | - | - | - | - | - | 59 | 295 | 295 | - | - | - | - | - | - | - | - | - | - |
| 2d.4.2 | Insurance | - | - | - | - | - | - | 378 | 38 | 416 | 416 | - | - | - | - | - | - | - | - | - | - |
| 2d.4.3 | Property taxes | - | - | - | - | - | - | 2,004 | 200 | 2,204 | 2,204 | - | - | - | - | - | - | - | - | - | - |
| 2d.4.4 | Health physics supplies | - | 794 | - | - | - | - | - | 198 | 992 | 992 | - | - | - | - | - | - | - | - | - | - |
| 2d.4.5 | Heavy equipment rental | - | 2,007 | - | - | - | - | - | 301 | 2,308 | 2,308 | - | - | - | - | - | - | - | - | - | - |
| 2d.4.6 | Disposal of DAW generated | - | - | 40 | 16 | - | 165 | - | 48 | 268 | 268 | - | - | 2,002 | - | - | - | - | 40,031 | 65 | - |
| 2d.4.7 | Plant energy budget | - | - | - | - | - | - | 506 | 76 | 582 | 582 | - | - | - | - | - | - | - | - | - | - |
| 2d.4.8 | NRC Fees | - | - | - | - | - | - | 277 | 28 | 305 | 305 | - | - | - | - | - | - | - | - | - | - |
| 2d.4.9 | Emergency Planning Fees | - | - | - | - | - | - | 58 | 6 | 64 | - | 64 | - | - | - | - | - | - | - | - | - |
| 2d.4.10 | Fixed Overhead | - | - | - | - | - | - | 929 | 139 | 1,068 | 1,068 | - | - | - | - | - | - | - | - | - | - |
| 2d.4.11 | Liquid Radwaste Processing Equipment/Services | - | - | - | - | - | - | 332 | 50 | 381 | 381 | - | - | - | - | - | - | - | - | - | - |
| 2d.4.12 | ISFSI Operating Costs | - | - | - | - | - | - | 44 | 7 | 50 | - | 50 | - | - | - | - | - | - | - | - | - |
| 2d.4.13 | Railroad Track Maintenance | - | - | - | - | - | - | 49 | 7 | 56 | 56 | - | - | - | - | - | - | - | - | - | - |
| 2d.4.14 | Remedial Actions Surveys | - | - | - | - | - | - | 875 | 131 | 1,006 | 1,006 | - | - | - | - | - | - | - | - | - | - |
| 2d.4.15 | Security Staff Cost | - | - | - | - | - | - | 5,782 | 867 | 6,649 | 4,694 | 1,955 | - | - | - | - | - | - | - | - | 84,454 |
| 2d.4.16 | DOC Staff Cost | - | - | - | - | - | - | 6,401 | 960 | 7,361 | 7,361 | - | - | - | - | - | - | - | - | - | 70,243 |
| 2d.4.17 | Utility Staff Cost | - | - | - | - | - | - | 8,100 | 1,215 | 9,315 | 8,858 | 456 | - | - | - | - | - | - | - | - | 126,681 |
| 2d.4 | Subtotal Period 2d Period-Dependent Costs | 236 | 2,801 | 40 | 16 | - | 165 | 25,734 | 4,330 | 33,321 | 30,796 | 2,525 | - | 2,002 | - | - | - | - | 40,031 | 65 | 281,377 |
| 2d.0 | TOTAL PERIOD 2d COST | 1,689 | 6,941 | 343 | 346 | 3,969 | 1,496 | 27,746 | 7,403 | 49,932 | 46,432 | 3,501 | - | 23,046 | 6,931 | - | - | - | 1,290,933 | 66,348 | 287,617 |
| PERIOD 2f - License Termination | | | | | | | | | | | | | | | | | | | | | |
| Period 2f Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| 2f.1.1 | ORISE confirmatory survey | - | - | - | - | - | - | 166 | 50 | 216 | 216 | - | - | - | - | - | - | - | - | - | - |
| 2f.1.2 | Terminate license | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 2f.1 | Subtotal Period 2f Activity Costs | - | - | - | - | - | - | 166 | 50 | 216 | 216 | - | - | - | - | - | - | - | - | - | - |
| Period 2f Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 2f.2.1 | License Termination Survey | - | - | - | - | - | - | 7,041 | 2,112 | 9,154 | 9,154 | - | - | - | - | - | - | - | - | 100,895 | 3,120 |
| 2f.2 | Subtotal Period 2f Additional Costs | - | - | - | - | - | - | 7,041 | 2,112 | 9,154 | 9,154 | - | - | - | - | - | - | - | - | 100,895 | 3,120 |
| Period 2f Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 2f.3.1 | DOC staff relocation expenses | - | - | - | - | - | - | 1,264 | 190 | 1,454 | 1,454 | - | - | - | - | - | - | - | - | - | - |
| 2f.3.2 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 934 | - | 934 | - | 934 | - | - | - | - | - | - | - | - | - |
| 2f.3 | Subtotal Period 2f Collateral Costs | - | - | - | - | - | - | 2,198 | 190 | 2,388 | 1,454 | 934 | - | - | - | - | - | - | - | - | - |
| Period 2f Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 2f.4.1 | Insurance | - | - | - | - | - | - | 362 | 36 | 398 | 398 | - | - | - | - | - | - | - | - | - | - |
| 2f.4.2 | Property taxes | - | - | - | - | - | - | 1,771 | 177 | 1,948 | 1,948 | - | - | - | - | - | - | - | - | - | - |
| 2f.4.3 | Health physics supplies | - | 710 | - | - | - | - | - | 178 | 888 | 888 | - | - | - | - | - | - | - | - | - | - |
| 2f.4.4 | Disposal of DAW generated | - | - | 7 | 3 | - | 28 | - | 8 | 45 | 45 | - | - | 334 | - | - | - | - | 6,685 | 11 | - |
| 2f.4.5 | Plant energy budget | - | - | - | - | - | - | 243 | 36 | 279 | 279 | - | - | - | - | - | - | - | - | - | - |
| 2f.4.6 | NRC Fees | - | - | - | - | - | - | 263 | 26 | 290 | 290 | - | - | - | - | - | - | - | - | - | - |
| 2f.4.7 | Emergency Planning Fees | - | - | - | - | - | - | 55 | 6 | 61 | - | 61 | - | - | - | - | - | - | - | - | - |
| 2f.4.8 | Fixed Overhead | - | - | - | - | - | - | 890 | 133 | 1,023 | 1,023 | - | - | - | - | - | - | - | - | - | - |
| 2f.4.9 | ISFSI Operating Costs | - | - | - | - | - | - | 42 | 6 | 48 | - | 48 | - | - | - | - | - | - | - | - | - |
| 2f.4.10 | Railroad Track Maintenance | - | - | - | - | - | - | 47 | 7 | 54 | 54 | - | - | - | - | - | - | - | - | - | - |
| 2f.4.11 | Security Staff Cost | - | - | - | - | - | - | 5,538 | 831 | 6,369 | 4,497 | 1,873 | - | - | - | - | - | - | - | - | 80,898 |
| 2f.4.12 | DOC Staff Cost | - | - | - | - | - | - | 4,238 | 636 | 4,874 | 4,874 | - | - | - | - | - | - | - | - | - | 46,283 |
| 2f.4.13 | Utility Staff Cost | - | - | - | - | - | - | 4,011 | 602 | 4,613 | 4,175 | 438 | - | - | - | - | - | - | - | - | 59,507 |
| 2f.4 | Subtotal Period 2f Period-Dependent Costs | - | 710 | 7 | 3 | - | 28 | 17,461 | 2,682 | 20,890 | 18,470 | 2,420 | - | - | 334 | - | - | - | 6,685 | 11 | 186,687 |
| 2f.0 | TOTAL PERIOD 2f COST | - | 710 | 7 | 3 | - | 28 | 26,867 | 5,034 | 32,648 | 29,294 | 3,354 | - | - | 334 | - | - | - | 6,685 | 100,906 | 189,807 |
| PERIOD 2 TOTALS | | 10,081 | 70,482 | 21,208 | 7,682 | 26,615 | 44,663 | 259,631 | 89,097 | 529,458 | 439,560 | 83,490 | 6,408 | 163,252 | 160,871 | 237 | 673 | - | 14,979,540 | 770,436 | 1,879,206 |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table D-2
Prairie Island DECON Unit 2
DECON Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|---------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| PERIOD 3b - Site Restoration | | | | | | | | | | | | | | | | | | | | | | |
| Period 3b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Demolition of Remaining Site Buildings | | | | | | | | | | | | | | | | | | | | | | |
| 3b.1.1.1 | Reactor | - | 4,645 | - | - | - | - | - | 697 | 5,342 | - | - | 5,342 | - | - | - | - | - | - | - | 44,679 | - |
| 3b.1.1.2 | Auxiliary | - | 1,993 | - | - | - | - | - | 299 | 2,291 | - | - | 2,291 | - | - | - | - | - | - | - | 11,902 | - |
| 3b.1.1.3 | Condensate Storage Tank Foundation | - | 7 | - | - | - | - | - | 1 | 8 | - | - | 8 | - | - | - | - | - | - | - | 33 | - |
| 3b.1.1.4 | Construction Warehouse & Fab Shop | - | 130 | - | - | - | - | - | 19 | 149 | - | - | 149 | - | - | - | - | - | - | - | 1,405 | - |
| 3b.1.1.5 | D3/D4 Emergency Generator | - | 14 | - | - | - | - | - | 2 | 16 | - | - | 16 | - | - | - | - | - | - | - | 84 | - |
| 3b.1.1.6 | Drum Transfer & Truck Loading Enclosure | - | 20 | - | - | - | - | - | 3 | 24 | - | - | 24 | - | - | - | - | - | - | - | 221 | - |
| 3b.1.1.7 | Hydrogen House | - | 6 | - | - | - | - | - | 1 | 7 | - | - | 7 | - | - | - | - | - | - | - | 47 | - |
| 3b.1.1.8 | LLRW Storage Enclosure | - | 128 | - | - | - | - | - | 19 | 147 | - | - | 147 | - | - | - | - | - | - | - | 853 | - |
| 3b.1.1.9 | Misc Structures 2017 | - | 2,617 | - | - | - | - | - | 393 | 3,009 | - | - | 3,009 | - | - | - | - | - | - | - | 22,582 | - |
| 3b.1.1.10 | Radwaste | - | 176 | - | - | - | - | - | 26 | 202 | - | - | 202 | - | - | - | - | - | - | - | 1,400 | - |
| 3b.1.1.11 | Resin Disposal | - | 14 | - | - | - | - | - | 2 | 16 | - | - | 16 | - | - | - | - | - | - | - | 120 | - |
| 3b.1.1.12 | Structures below 3' below grade | - | 1,785 | - | - | - | - | - | 268 | 2,052 | - | - | 2,052 | - | - | - | - | - | - | - | 9,238 | - |
| 3b.1.1.13 | Sulfuric Acid Tank Enclosure | - | 3 | - | - | - | - | - | 0 | 4 | - | - | 4 | - | - | - | - | - | - | - | 35 | - |
| 3b.1.1.14 | Turbine | - | 2,140 | - | - | - | - | - | 321 | 2,461 | - | - | 2,461 | - | - | - | - | - | - | - | 21,997 | - |
| 3b.1.1.15 | Turbine Pedestal | - | 365 | - | - | - | - | - | 55 | 420 | - | - | 420 | - | - | - | - | - | - | - | 1,857 | - |
| 3b.1.1.16 | Warehouse #2 | - | 24 | - | - | - | - | - | 4 | 27 | - | - | 27 | - | - | - | - | - | - | - | 213 | - |
| 3b.1.1.17 | Waste Neutralizing Tank House | - | 7 | - | - | - | - | - | 1 | 8 | - | - | 8 | - | - | - | - | - | - | - | 56 | - |
| 3b.1.1.18 | Waste Oil Storage | - | 9 | - | - | - | - | - | 1 | 10 | - | - | 10 | - | - | - | - | - | - | - | 70 | - |
| 3b.1.1.19 | Water Treatment | - | 324 | - | - | - | - | - | 49 | 373 | - | - | 373 | - | - | - | - | - | - | - | 2,690 | - |
| 3b.1.1.20 | Fuel Handling of Aux Building | - | 1,095 | - | - | - | - | - | 164 | 1,259 | - | - | 1,259 | - | - | - | - | - | - | - | 8,240 | - |
| 3b.1.1 | Totals | - | 15,501 | - | - | - | - | - | 2,325 | 17,826 | - | - | 17,826 | - | - | - | - | - | - | - | 127,723 | - |
| Site Closeout Activities | | | | | | | | | | | | | | | | | | | | | | |
| 3b.1.2 | Remove Rubble | - | 1,330 | - | - | - | - | - | 200 | 1,530 | - | - | 1,530 | - | - | - | - | - | - | - | 6,495 | - |
| 3b.1.3 | Grade & landscape site | - | 448 | - | - | - | - | - | 67 | 515 | - | - | 515 | - | - | - | - | - | - | - | 921 | - |
| 3b.1.4 | Final report to NRC | - | - | - | - | - | - | 86 | 13 | 99 | 99 | - | - | - | - | - | - | - | - | - | - | 667 |
| 3b.1 | Subtotal Period 3b Activity Costs | - | 17,279 | - | - | - | - | 86 | 2,605 | 19,969 | 99 | - | 19,871 | - | - | - | - | - | - | - | 135,138 | 667 |
| Period 3b Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3b.2.1 | Clean Concrete Disposal | - | 4,912 | - | - | - | - | 10 | 738 | 5,660 | - | - | 5,660 | - | - | - | - | - | - | - | 18,372 | - |
| 3b.2.2 | Intake Structure Cofferdam | - | 442 | - | - | - | - | - | 66 | 508 | - | - | 508 | - | - | - | - | - | - | - | 3,552 | - |
| 3b.2.3 | Construction Debris | - | - | - | - | - | - | 2,150 | 323 | 2,473 | - | - | 2,473 | - | - | - | - | - | - | - | - | - |
| 3b.2.4 | Backfill | - | 9,257 | - | - | - | - | - | 1,388 | 10,645 | - | - | 10,645 | - | - | - | - | - | - | - | 9,327 | - |
| 3b.2 | Subtotal Period 3b Additional Costs | - | 14,610 | - | - | - | - | 2,160 | 2,516 | 19,286 | - | - | 19,286 | - | - | - | - | - | - | - | 31,251 | - |
| Period 3b Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3b.3.1 | Small tool allowance | - | 212 | - | - | - | - | - | 32 | 244 | - | - | 244 | - | - | - | - | - | - | - | - | - |
| 3b.3.2 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 2,649 | - | 2,649 | - | 2,649 | - | - | - | - | - | - | - | - | - | - |
| 3b.3 | Subtotal Period 3b Collateral Costs | - | 212 | - | - | - | - | 2,649 | 32 | 2,892 | - | 2,649 | 244 | - | - | - | - | - | - | - | - | - |
| Period 3b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3b.4.1 | Insurance | - | - | - | - | - | - | 513 | 51 | 565 | 565 | - | - | - | - | - | - | - | - | - | - | - |
| 3b.4.2 | Property taxes | - | - | - | - | - | - | 4,167 | 417 | 4,583 | - | 4,583 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.3 | Heavy equipment rental | - | 7,144 | - | - | - | - | - | 1,072 | 8,215 | - | - | 8,215 | - | - | - | - | - | - | - | - | - |
| 3b.4.4 | Plant energy budget | - | - | - | - | - | - | 344 | 52 | 395 | - | 395 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.5 | NRC ISFSI Fees | - | - | - | - | - | - | 218 | 22 | 239 | - | 239 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.6 | Emergency Planning Fees | - | - | - | - | - | - | 157 | 16 | 173 | - | 173 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.7 | Fixed Overhead | - | - | - | - | - | - | 1,024 | 154 | 1,178 | 397 | 781 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.8 | ISFSI Operating Costs | - | - | - | - | - | - | 119 | 18 | 136 | - | 136 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.9 | Railroad Track Maintenance | - | - | - | - | - | - | 361 | 54 | 416 | 153 | 263 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.10 | Security Staff Cost | - | - | - | - | - | - | 4,616 | 692 | 5,308 | - | 5,308 | - | - | - | - | - | - | - | - | - | 57,340 |
| 3b.4.11 | DOC Staff Cost | - | - | - | - | - | - | 10,921 | 1,638 | 12,559 | - | - | 12,559 | - | - | - | - | - | - | - | - | 116,885 |
| 3b.4.12 | Utility Staff Cost | - | - | - | - | - | - | 5,004 | 751 | 5,755 | - | 1,237 | 4,517 | - | - | - | - | - | - | - | - | 74,431 |
| 3b.4 | Subtotal Period 3b Period-Dependent Costs | - | 7,144 | - | - | - | - | 27,444 | 4,935 | 39,523 | 1,114 | 13,117 | 25,292 | - | - | - | - | - | - | - | - | 248,656 |
| 3b.0 | TOTAL PERIOD 3b COST | - | 39,245 | - | - | - | - | 32,338 | 10,087 | 81,671 | 1,213 | 15,766 | 64,692 | - | - | - | - | - | - | - | 166,388 | 249,323 |

**Prairie Island Nuclear Generating Plant
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**Table D-2
Prairie Island DECON Unit 2
DECON Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|-----------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| PERIOD 3c - Fuel Storage Operations/Shipping | | | | | | | | | | | | | | | | | | | | | | |
| Period 3c Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Period 3c Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3c.3.1 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 18,191 | 2,729 | 20,919 | - | 20,919 | - | - | - | - | - | - | - | - | - | - |
| 3c.3.2 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 44,363 | - | 44,363 | - | 44,363 | - | - | - | - | - | - | - | - | - | - |
| 3c.3 | Subtotal Period 3c Collateral Costs | - | - | - | - | - | - | 62,554 | 2,729 | 65,283 | - | 65,283 | - | - | - | - | - | - | - | - | - | - |
| Period 3c Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3c.4.1 | Insurance | - | - | - | - | - | - | 8,599 | 860 | 9,459 | - | 9,459 | - | - | - | - | - | - | - | - | - | - |
| 3c.4.2 | Property taxes | - | - | - | - | - | - | 49,245 | 4,924 | 54,169 | - | 54,169 | - | - | - | - | - | - | - | - | - | - |
| 3c.4.4 | NRC ISFSI Fees | - | - | - | - | - | - | 5,140 | 514 | 5,653 | - | 5,653 | - | - | - | - | - | - | - | - | - | - |
| 3c.4.5 | Emergency Planning Fees | - | - | - | - | - | - | 2,633 | 263 | 2,896 | - | 2,896 | - | - | - | - | - | - | - | - | - | - |
| 3c.4.6 | Fixed Overhead | - | - | - | - | - | - | 5,787 | 868 | 6,655 | - | 6,655 | - | - | - | - | - | - | - | - | - | - |
| 3c.4.7 | ISFSI Operating Costs | - | - | - | - | - | - | 1,988 | 298 | 2,286 | - | 2,286 | - | - | - | - | - | - | - | - | - | - |
| 3c.4.8 | Railroad Track Maintenance | - | - | - | - | - | - | 2,220 | 333 | 2,554 | - | 2,554 | - | - | - | - | - | - | - | - | - | - |
| 3c.4.9 | Security Staff Cost | - | - | - | - | - | - | 77,306 | 11,596 | 88,902 | - | 88,902 | - | - | - | - | - | - | - | - | - | 960,328 |
| 3c.4.10 | Utility Staff Cost | - | - | - | - | - | - | 18,035 | 2,705 | 20,740 | - | 20,740 | - | - | - | - | - | - | - | - | - | 249,316 |
| 3c.4 | Subtotal Period 3c Period-Dependent Costs | - | - | - | - | - | - | 170,952 | 22,362 | 193,314 | - | 193,314 | - | - | - | - | - | - | - | - | - | 1,209,643 |
| 3c.0 | TOTAL PERIOD 3c COST | - | - | - | - | - | - | 233,506 | 25,091 | 258,597 | - | 258,597 | - | - | - | - | - | - | - | - | - | 1,209,643 |
| PERIOD 3d - GTCC shipping | | | | | | | | | | | | | | | | | | | | | | |
| Period 3d Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Nuclear Steam Supply System Removal | | | | | | | | | | | | | | | | | | | | | | |
| 3d.1.1.1 | Vessel & Internals GTCC Disposal | - | - | 1,444 | - | - | 8,680 | - | 1,663 | 11,787 | 11,787 | - | - | - | - | - | - | 1,773 | 344,823 | - | - | - |
| 3d.1.1 | Totals | - | - | 1,444 | - | - | 8,680 | - | 1,663 | 11,787 | 11,787 | - | - | - | - | - | - | 1,773 | 344,823 | - | - | - |
| 3d.1 | Subtotal Period 3d Activity Costs | - | - | 1,444 | - | - | 8,680 | - | 1,663 | 11,787 | 11,787 | - | - | - | - | - | - | 1,773 | 344,823 | - | - | - |
| Period 3d Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3d.3.1 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 28 | 4 | 32 | - | 32 | - | - | - | - | - | - | - | - | - | - |
| 3d.3.2 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 48 | - | 48 | - | 48 | - | - | - | - | - | - | - | - | - | - |
| 3d.3 | Subtotal Period 3d Collateral Costs | - | - | - | - | - | - | 76 | 4 | 80 | - | 80 | - | - | - | - | - | - | - | - | - | - |
| Period 3d Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3d.4.1 | Insurance | - | - | - | - | - | - | 9 | 1 | 10 | 10 | - | - | - | - | - | - | - | - | - | - | - |
| 3d.4.2 | Property taxes | - | - | - | - | - | - | 53 | 5 | 58 | 58 | - | - | - | - | - | - | - | - | - | - | - |
| 3d.4.4 | NRC ISFSI Fees | - | - | - | - | - | - | 4 | 0 | 4 | - | 4 | - | - | - | - | - | - | - | - | - | - |
| 3d.4.5 | Emergency Planning Fees | - | - | - | - | - | - | 3 | 0 | 3 | - | 3 | - | - | - | - | - | - | - | - | - | - |
| 3d.4.6 | Fixed Overhead | - | - | - | - | - | - | 6 | 1 | 7 | 7 | - | - | - | - | - | - | - | - | - | - | - |
| 3d.4.7 | Railroad Track Maintenance | - | - | - | - | - | - | 2 | 0 | 3 | 3 | - | - | - | - | - | - | - | - | - | - | - |
| 3d.4.8 | Security Staff Cost | - | - | - | - | - | - | 83 | 13 | 96 | 96 | - | - | - | - | - | - | - | - | - | - | 1,037 |
| 3d.4.9 | Utility Staff Cost | - | - | - | - | - | - | 19 | 3 | 22 | 22 | - | - | - | - | - | - | - | - | - | - | 269 |
| 3d.4 | Subtotal Period 3d Period-Dependent Costs | - | - | - | - | - | - | 181 | 24 | 204 | 197 | 7 | - | - | - | - | - | - | - | - | - | 1,306 |
| 3d.0 | TOTAL PERIOD 3d COST | - | - | 1,444 | - | - | 8,680 | 256 | 1,691 | 12,071 | 11,984 | 87 | - | - | - | - | - | 1,773 | 344,823 | - | - | 1,306 |
| PERIOD 3e - ISFSI Decontamination | | | | | | | | | | | | | | | | | | | | | | |
| Period 3e Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Period 3e Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3e.2.1 | License Termination ISFSI | - | 24 | 81 | 435 | - | 2,532 | 839 | 978 | 4,890 | 4,890 | - | - | - | 9,355 | - | - | - | 1,123,457 | 3,762 | 1,065 | |
| 3e.2 | Subtotal Period 3e Additional Costs | - | 24 | 81 | 435 | - | 2,532 | 839 | 978 | 4,890 | 4,890 | - | - | - | 9,355 | - | - | - | 1,123,457 | 3,762 | 1,065 | |
| Period 3e Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3e.4.1 | Insurance | - | - | - | - | - | - | 93 | 23 | 116 | 116 | - | - | - | - | - | - | - | - | - | - | - |
| 3e.4.2 | Property taxes | - | - | - | - | - | - | 56 | 14 | 69 | 69 | - | - | - | - | - | - | - | - | - | - | - |
| 3e.4.3 | Plant energy budget | - | - | - | - | - | - | 11 | 3 | 13 | 13 | - | - | - | - | - | - | - | - | - | - | - |
| 3e.4.4 | Fixed Overhead | - | - | - | - | - | - | 54 | 14 | 68 | 68 | - | - | - | - | - | - | - | - | - | - | - |
| 3e.4.5 | Railroad Track Maintenance | - | - | - | - | - | - | 21 | 5 | 26 | 26 | - | - | - | - | - | - | - | - | - | - | - |
| 3e.4.6 | Security Staff Cost | - | - | - | - | - | - | 174 | 43 | 217 | 217 | - | - | - | - | - | - | - | - | - | - | 2,500 |
| 3e.4.7 | Utility Staff Cost | - | - | - | - | - | - | 129 | 32 | 161 | 161 | - | - | - | - | - | - | - | - | - | - | 1,896 |
| 3e.4 | Subtotal Period 3e Period-Dependent Costs | - | - | - | - | - | - | 536 | 134 | 670 | 670 | - | - | - | - | - | - | - | - | - | - | 4,396 |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table D-2
Prairie Island DECON Unit 2
DECON Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|-------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| 3e.0 | TOTAL PERIOD 3e COST | - | 24 | 81 | 435 | - | 2,532 | 1,375 | 1,112 | 5,560 | 5,560 | - | - | - | 9,355 | - | - | - | - | 1,123,457 | 3,762 | 5,460 |
| PERIOD 3f - ISFSI Site Restoration | | | | | | | | | | | | | | | | | | | | | | |
| Period 3f Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Period 3f Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3f.2.1 | Demolition and Site Restoration of ISFSI | - | 515 | - | - | - | - | 68 | 87 | 670 | - | - | 670 | - | - | - | - | - | - | - | 2,219 | 80 |
| 3f.2 | Subtotal Period 3f Additional Costs | - | 515 | - | - | - | - | 68 | 87 | 670 | - | - | 670 | - | - | - | - | - | - | - | 2,219 | 80 |
| Period 3f Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3f.3.1 | Small tool allowance | - | 3 | - | - | - | - | - | 0 | 4 | - | - | 4 | - | - | - | - | - | - | - | - | - |
| 3f.3 | Subtotal Period 3f Collateral Costs | - | 3 | - | - | - | - | - | 0 | 4 | - | - | 4 | - | - | - | - | - | - | - | - | - |
| Period 3f Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3f.4.2 | Property taxes | - | - | - | - | - | - | 28 | 3 | 31 | - | - | 31 | - | - | - | - | - | - | - | - | - |
| 3f.4.3 | Heavy equipment rental | - | 59 | - | - | - | - | - | 9 | 68 | - | - | 68 | - | - | - | - | - | - | - | - | - |
| 3f.4.4 | Plant energy budget | - | - | - | - | - | - | 6 | 1 | 6 | - | - | 6 | - | - | - | - | - | - | - | - | - |
| 3f.4.5 | Fixed Overhead | - | - | - | - | - | - | 28 | 4 | 32 | - | - | 32 | - | - | - | - | - | - | - | - | - |
| 3f.4.6 | Railroad Track Maintenance | - | - | - | - | - | - | 11 | 2 | 12 | - | - | 12 | - | - | - | - | - | - | - | - | - |
| 3f.4.7 | Security Staff Cost | - | - | - | - | - | - | 89 | 13 | 102 | - | - | 102 | - | - | - | - | - | - | - | - | 1,281 |
| 3f.4.8 | Utility Staff Cost | - | - | - | - | - | - | 55 | 8 | 63 | - | - | 63 | - | - | - | - | - | - | - | - | 795 |
| 3f.4 | Subtotal Period 3f Period-Dependent Costs | - | 59 | - | - | - | - | 216 | 40 | 315 | - | - | 315 | - | - | - | - | - | - | - | - | 2,076 |
| 3f.0 | TOTAL PERIOD 3f COST | - | 577 | - | - | - | - | 284 | 128 | 989 | - | - | 989 | - | - | - | - | - | - | - | 2,219 | 2,156 |
| PERIOD 3 TOTALS | | | | | | | | | | | | | | | | | | | | | | |
| TOTAL COST TO DECOMMISSION | | | | | | | | | | | | | | | | | | | | | | |
| | | 13,876 | 116,246 | 23,184 | 8,596 | 26,793 | 61,273 | 633,922 | 146,053 | 1,029,941 | 590,962 | 366,208 | 72,770 | 169,384 | 184,110 | 826 | 673 | 1,773 | 17,056,350 | 976,284 | 4,146,322 | |

| | | |
|--|--------------------|----------------------------------|
| TOTAL COST TO DECOMMISSION WITH 16.52% CONTINGENCY: | \$1,029,941 | thousands of 2020 dollars |
| TOTAL NRC LICENSE TERMINATION COST IS 57.38% OR: | \$590,962 | thousands of 2020 dollars |
| SPENT FUEL MANAGEMENT COST IS 35.56% OR: | \$366,208 | thousands of 2020 dollars |
| NON-NUCLEAR DEMOLITION COST IS 7.07% OR: | \$72,770 | thousands of 2020 dollars |
| TOTAL LOW-LEVEL RADIOACTIVE WASTE VOLUME BURIED (EXCLUDING GTCC): | 185,608 | Cubic Feet |
| TOTAL GREATER THAN CLASS C RADWASTE VOLUME GENERATED: | 1,773 | Cubic Feet |
| TOTAL SCRAP METAL REMOVED: | 42,328 | Tons |
| TOTAL CRAFT LABOR REQUIREMENTS: | 976,284 | Man-hours |

End Notes:
n/a - indicates that this activity not charged as decommissioning expense
a - indicates that this activity performed by decommissioning staff
0 - indicates that this value is less than 0.5 but is non-zero
A cell containing " - " indicates a zero value

***Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis***

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APPENDIX E

DETAILED COST ANALYSIS

SCENARIO 3: DECON with 100 Year DFS

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| Prairie Island Nuclear Generating Plant, Unit 2 | E-11 |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table E-1
Prairie Island DECON Unit 1
DECON Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|--|--|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| PERIOD 1a - Shutdown through Transition | | | | | | | | | | | | | | | | | | | | | |
| Period 1a Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| 1a.1.1 | Prepare preliminary decommissioning cost | - | - | - | - | - | - | 167 | 25 | 192 | 192 | - | - | - | - | - | - | - | - | - | 1,300 |
| 1a.1.2 | Notification of Cessation of Operations | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.3 | Remove fuel & source material | - | - | - | - | - | - | - | - | n/a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.4 | Notification of Permanent Defueling | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.5 | Deactivate plant systems & process waste | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.6 | Prepare and submit PSDAR | - | - | - | - | - | - | 257 | 39 | 296 | 296 | - | - | - | - | - | - | - | - | - | 2,000 |
| 1a.1.7 | Review plant dwgs & specs. | - | - | - | - | - | - | 591 | 89 | 680 | 680 | - | - | - | - | - | - | - | - | - | 4,600 |
| 1a.1.8 | Perform detailed rad survey | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.9 | Estimate by-product inventory | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| 1a.1.10 | End product description | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| 1a.1.11 | Detailed by-product inventory | - | - | - | - | - | - | 167 | 25 | 192 | 192 | - | - | - | - | - | - | - | - | - | 1,300 |
| 1a.1.12 | Define major work sequence | - | - | - | - | - | - | 964 | 145 | 1,108 | 1,108 | - | - | - | - | - | - | - | - | - | 7,500 |
| 1a.1.13 | Perform SER and EA | - | - | - | - | - | - | 398 | 60 | 458 | 458 | - | - | - | - | - | - | - | - | - | 3,100 |
| 1a.1.14 | Prepare/submit Defueled Technical Specifications | - | - | - | - | - | - | 964 | 145 | 1,108 | 1,108 | - | - | - | - | - | - | - | - | - | 7,500 |
| 1a.1.15 | Perform Site-Specific Cost Study | - | - | - | - | - | - | 643 | 96 | 739 | 739 | - | - | - | - | - | - | - | - | - | 5,000 |
| 1a.1.16 | Prepare/submit Irradiated Fuel Management Plan | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| Activity Specifications | | | | | | | | | | | | | | | | | | | | | |
| 1a.1.17.1 | Plant & temporary facilities | - | - | - | - | - | - | 632 | 95 | 727 | 654 | - | 73 | - | - | - | - | - | - | - | 4,920 |
| 1a.1.17.2 | Plant systems | - | - | - | - | - | - | 536 | 80 | 616 | 554 | - | 62 | - | - | - | - | - | - | - | 4,167 |
| 1a.1.17.3 | NSSS Decontamination Flush | - | - | - | - | - | - | 64 | 10 | 74 | 74 | - | - | - | - | - | - | - | - | - | 500 |
| 1a.1.17.4 | Reactor internals | - | - | - | - | - | - | 912 | 137 | 1,049 | 1,049 | - | - | - | - | - | - | - | - | - | 7,100 |
| 1a.1.17.5 | Reactor vessel | - | - | - | - | - | - | 835 | 125 | 961 | 961 | - | - | - | - | - | - | - | - | - | 6,500 |
| 1a.1.17.6 | Biological shield | - | - | - | - | - | - | 64 | 10 | 74 | 74 | - | - | - | - | - | - | - | - | - | 500 |
| 1a.1.17.7 | Steam generators | - | - | - | - | - | - | 401 | 60 | 461 | 461 | - | - | - | - | - | - | - | - | - | 3,120 |
| 1a.1.17.8 | Reinforced concrete | - | - | - | - | - | - | 206 | 31 | 236 | 118 | - | 118 | - | - | - | - | - | - | - | 1,600 |
| 1a.1.17.9 | Main Turbine | - | - | - | - | - | - | 51 | 8 | 59 | - | - | 59 | - | - | - | - | - | - | - | 400 |
| 1a.1.17.10 | Main Condensers | - | - | - | - | - | - | 51 | 8 | 59 | - | - | 59 | - | - | - | - | - | - | - | 400 |
| 1a.1.17.11 | Plant structures & buildings | - | - | - | - | - | - | 401 | 60 | 461 | 231 | - | 231 | - | - | - | - | - | - | - | 3,120 |
| 1a.1.17.12 | Waste management | - | - | - | - | - | - | 591 | 89 | 680 | 680 | - | - | - | - | - | - | - | - | - | 4,600 |
| 1a.1.17.13 | Facility & site closeout | - | - | - | - | - | - | 116 | 17 | 133 | 67 | - | 67 | - | - | - | - | - | - | - | 900 |
| 1a.1.17 | Total | - | - | - | - | - | - | 4,861 | 729 | 5,591 | 4,923 | - | 668 | - | - | - | - | - | - | - | 37,827 |
| Planning & Site Preparations | | | | | | | | | | | | | | | | | | | | | |
| 1a.1.18 | Prepare dismantling sequence | - | - | - | - | - | - | 308 | 46 | 355 | 355 | - | - | - | - | - | - | - | - | - | 2,400 |
| 1a.1.19 | Plant prep. & temp. svces | - | - | - | - | - | - | 3,500 | 525 | 4,025 | 4,025 | - | - | - | - | - | - | - | - | - | - |
| 1a.1.20 | Design water clean-up system | - | - | - | - | - | - | 180 | 27 | 207 | 207 | - | - | - | - | - | - | - | - | - | 1,400 |
| 1a.1.21 | Rigging/Cont. Cntrl Envlps/tooling/etc. | - | - | - | - | - | - | 2,400 | 360 | 2,760 | 2,760 | - | - | - | - | - | - | - | - | - | - |
| 1a.1.22 | Procure casks/liners & containers | - | - | - | - | - | - | 158 | 24 | 182 | 182 | - | - | - | - | - | - | - | - | - | 1,230 |
| 1a.1 | Subtotal Period 1a Activity Costs | - | - | - | - | - | - | 15,945 | 2,392 | 18,336 | 17,669 | - | 668 | - | - | - | - | - | - | - | 78,157 |
| Period 1a Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 1a.2.1 | Spent Fuel Pool Isolation | - | - | - | - | - | - | 12,675 | 1,901 | 14,576 | 14,576 | - | - | - | - | - | - | - | - | - | - |
| 1a.2 | Subtotal Period 1a Additional Costs | - | - | - | - | - | - | 12,675 | 1,901 | 14,576 | 14,576 | - | - | - | - | - | - | - | - | - | - |
| Period 1a Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 1a.3.1 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 1,249 | - | 1,249 | - | 1,249 | - | - | - | - | - | - | - | - | - |
| 1a.3 | Subtotal Period 1a Collateral Costs | - | - | - | - | - | - | 1,249 | - | 1,249 | - | 1,249 | - | - | - | - | - | - | - | - | - |
| Period 1a Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 1a.4.1 | Insurance | - | - | - | - | - | - | 1,660 | 166 | 1,826 | 1,826 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.2 | Property taxes | - | - | - | - | - | - | 3,623 | 362 | 3,985 | 3,985 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.3 | Health physics supplies | - | 614 | - | - | - | - | - | 153 | 767 | 767 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.4 | Heavy equipment rental | - | 753 | - | - | - | - | - | 113 | 866 | 866 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.5 | Disposal of DAW generated | - | - | 12 | 5 | - | 50 | - | 14 | 82 | 82 | - | - | 610 | - | - | - | - | 12,190 | 20 | - |
| 1a.4.6 | Plant energy budget | - | - | - | - | - | - | 1,621 | 243 | 1,864 | 1,864 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.7 | NRC Fees | - | - | - | - | - | - | 1,137 | 114 | 1,251 | 1,251 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.8 | Emergency Planning Fees | - | - | - | - | - | - | 2,174 | 217 | 2,392 | - | 2,392 | - | - | - | - | - | - | - | - | - |
| 1a.4.9 | Fixed Overhead | - | - | - | - | - | - | 1,440 | 216 | 1,656 | 1,656 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.10 | Spent Fuel Pool O&M | - | - | - | - | - | - | 422 | 63 | 486 | - | 486 | - | - | - | - | - | - | - | - | - |
| 1a.4.11 | ISFSI Operating Costs | - | - | - | - | - | - | 56 | 8 | 64 | - | 64 | - | - | - | - | - | - | - | - | - |
| 1a.4.12 | Railroad Track Maintenance | - | - | - | - | - | - | 63 | 9 | 72 | 72 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.13 | Security Staff Cost | - | - | - | - | - | - | 8,328 | 1,249 | 9,577 | 9,577 | - | - | - | - | - | - | - | - | - | 122,720 |
| 1a.4.14 | Utility Staff Cost | - | - | - | - | - | - | 26,931 | 4,040 | 30,971 | 30,971 | - | - | - | - | - | - | - | - | - | 422,240 |
| 1a.4 | Subtotal Period 1a Period-Dependent Costs | - | 1,367 | 12 | 5 | - | 50 | 47,456 | 6,970 | 55,860 | 52,918 | 2,942 | - | 610 | - | - | - | - | 12,190 | 20 | 544,960 |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table E-1
Prairie Island DECON Unit 1
DECON Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|--|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| 1a.0 | TOTAL PERIOD 1a COST | - | 1,367 | 12 | 5 | - | 50 | 77,325 | 11,263 | 90,022 | 85,163 | 4,191 | 668 | - | 610 | - | - | - | 12,190 | 20 | 623,117 |
| PERIOD 1b - Decommissioning Preparations | | | | | | | | | | | | | | | | | | | | | |
| Period 1b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| Detailed Work Procedures | | | | | | | | | | | | | | | | | | | | | |
| 1b.1.1.1 | Plant systems | - | - | - | - | - | - | 608 | 91 | 700 | 630 | - | 70 | - | - | - | - | - | - | - | 4,733 |
| 1b.1.1.2 | NSSS Decontamination Flush | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| 1b.1.1.3 | Reactor internals | - | - | - | - | - | - | 321 | 48 | 369 | 369 | - | - | - | - | - | - | - | - | - | 2,500 |
| 1b.1.1.4 | Remaining buildings | - | - | - | - | - | - | 174 | 26 | 200 | 50 | - | 150 | - | - | - | - | - | - | - | 1,350 |
| 1b.1.1.5 | CRD cooling assembly | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| 1b.1.1.6 | CRD housings & ICI tubes | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| 1b.1.1.7 | Incore instrumentation | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| 1b.1.1.8 | Reactor vessel | - | - | - | - | - | - | 467 | 70 | 537 | 537 | - | - | - | - | - | - | - | - | - | 3,630 |
| 1b.1.1.9 | Facility closeout | - | - | - | - | - | - | 154 | 23 | 177 | 89 | - | 89 | - | - | - | - | - | - | - | 1,200 |
| 1b.1.1.10 | Missile shields | - | - | - | - | - | - | 58 | 9 | 67 | 67 | - | - | - | - | - | - | - | - | - | 450 |
| 1b.1.1.11 | Biological shield | - | - | - | - | - | - | 154 | 23 | 177 | 177 | - | - | - | - | - | - | - | - | - | 1,200 |
| 1b.1.1.12 | Steam generators | - | - | - | - | - | - | 591 | 89 | 680 | 680 | - | - | - | - | - | - | - | - | - | 4,600 |
| 1b.1.1.13 | Reinforced concrete | - | - | - | - | - | - | 129 | 19 | 148 | 74 | - | 74 | - | - | - | - | - | - | - | 1,000 |
| 1b.1.1.14 | Main Turbine | - | - | - | - | - | - | 200 | 30 | 231 | - | - | 231 | - | - | - | - | - | - | - | 1,560 |
| 1b.1.1.15 | Main Condensers | - | - | - | - | - | - | 200 | 30 | 231 | - | - | 231 | - | - | - | - | - | - | - | 1,560 |
| 1b.1.1.16 | Auxiliary building | - | - | - | - | - | - | 351 | 53 | 403 | 363 | - | 40 | - | - | - | - | - | - | - | 2,730 |
| 1b.1.1.17 | Reactor building | - | - | - | - | - | - | 351 | 53 | 403 | 363 | - | 40 | - | - | - | - | - | - | - | 2,730 |
| 1b.1.1 | Total | - | - | - | - | - | - | 4,272 | 641 | 4,913 | 3,989 | - | 924 | - | - | - | - | - | - | - | 33,243 |
| 1b.1.2 | Decon primary loop | 572 | - | - | - | - | - | - | 286 | 859 | 859 | - | - | - | - | - | - | - | - | 1,067 | - |
| 1b.1 | Subtotal Period 1b Activity Costs | 572 | - | - | - | - | - | 4,272 | 927 | 5,772 | 4,848 | - | 924 | - | - | - | - | - | - | 1,067 | 33,243 |
| Period 1b Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 1b.2.1 | Site Characterization | - | - | - | - | - | - | 3,520 | 1,056 | 4,576 | 4,576 | - | - | - | - | - | - | - | - | 21,020 | 8,332 |
| 1b.2.2 | Mixed/Hazardous Waste | - | - | 353 | 94 | 178 | - | - | 76 | 702 | 702 | - | - | 6,132 | - | - | - | - | 351,977 | 2,348 | - |
| 1b.2.3 | Asbestos Abatement | - | 2,526 | 3 | 150 | - | 1,369 | - | 996 | 5,044 | 5,044 | - | - | - | 12,843 | - | - | - | 166,959 | 20,907 | - |
| 1b.2 | Subtotal Period 1b Additional Costs | - | 2,526 | 356 | 244 | 178 | 1,369 | 3,520 | 2,129 | 10,321 | 10,321 | - | - | 6,132 | 12,843 | - | - | - | 518,936 | 44,275 | 8,332 |
| Period 1b Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 1b.3.1 | Decon equipment | 1,055 | - | - | - | - | - | - | 158 | 1,213 | 1,213 | - | - | - | - | - | - | - | - | - | - |
| 1b.3.2 | DOC staff relocation expenses | - | - | - | - | - | - | 1,264 | 190 | 1,454 | 1,454 | - | - | - | - | - | - | - | - | - | - |
| 1b.3.3 | Process decommissioning water waste | 25 | - | 16 | 29 | - | 66 | - | 35 | 172 | 172 | - | - | 152 | - | - | - | - | 9,127 | 30 | - |
| 1b.3.4 | Process decommissioning chemical flush waste | 2 | - | 61 | 199 | - | 3,889 | - | 1,009 | 5,159 | 5,159 | - | - | - | - | 588 | - | - | 62,689 | 110 | - |
| 1b.3.5 | Small tool allowance | - | 36 | - | - | - | - | - | 5 | 42 | 42 | - | - | - | - | - | - | - | - | - | - |
| 1b.3.6 | Pipe cutting equipment | - | 1,200 | - | - | - | - | - | 180 | 1,380 | 1,380 | - | - | - | - | - | - | - | - | - | - |
| 1b.3.7 | Decon rig | 2,104 | - | - | - | - | - | - | 316 | 2,419 | 2,419 | - | - | - | - | - | - | - | - | - | - |
| 1b.3.8 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 163 | 25 | 188 | - | 188 | - | - | - | - | - | - | - | - | - |
| 1b.3.9 | Retention and Severance | - | - | - | - | - | - | 1,032 | 155 | 1,187 | 1,187 | - | - | - | - | - | - | - | - | - | - |
| 1b.3.10 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 623 | - | 623 | - | 623 | - | - | - | - | - | - | - | - | - |
| 1b.3 | Subtotal Period 1b Collateral Costs | 3,185 | 1,236 | 77 | 228 | - | 3,955 | 3,082 | 2,072 | 13,836 | 13,025 | 811 | - | 152 | 588 | - | - | - | 71,815 | 140 | - |
| Period 1b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 1b.4.1 | Decon supplies | 38 | - | - | - | - | - | - | 9 | 47 | 47 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.2 | Insurance | - | - | - | - | - | - | 828 | 83 | 910 | 910 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.3 | Property taxes | - | - | - | - | - | - | 1,806 | 181 | 1,987 | 1,987 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.4 | Health physics supplies | - | 475 | - | - | - | - | - | 119 | 594 | 594 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.5 | Heavy equipment rental | - | 375 | - | - | - | - | - | 56 | 432 | 432 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.6 | Disposal of DAW generated | - | - | 7 | 3 | - | 29 | - | 8 | 48 | 48 | - | - | 356 | - | - | - | - | 7,122 | 12 | - |
| 1b.4.7 | Plant energy budget | - | - | - | - | - | - | 1,617 | 243 | 1,859 | 1,859 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.8 | NRC Fees | - | - | - | - | - | - | 323 | 32 | 355 | 355 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.9 | Emergency Planning Fees | - | - | - | - | - | - | 1,084 | 108 | 1,193 | - | 1,193 | - | - | - | - | - | - | - | - | - |
| 1b.4.10 | Fixed Overhead | - | - | - | - | - | - | 718 | 108 | 826 | 826 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.11 | Spent Fuel Pool O&M | - | - | - | - | - | - | 211 | 32 | 242 | - | 242 | - | - | - | - | - | - | - | - | - |
| 1b.4.12 | ISFSI Operating Costs | - | - | - | - | - | - | 28 | 4 | 32 | - | 32 | - | - | - | - | - | - | - | - | - |
| 1b.4.13 | Railroad Track Maintenance | - | - | - | - | - | - | 31 | 5 | 36 | 36 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.14 | Security Staff Cost | - | - | - | - | - | - | 4,153 | 623 | 4,775 | 4,775 | - | - | - | - | - | - | - | - | - | 61,192 |
| 1b.4.15 | DOC Staff Cost | - | - | - | - | - | - | 5,846 | 877 | 6,723 | 6,723 | - | - | - | - | - | - | - | - | - | 63,266 |
| 1b.4.16 | Utility Staff Cost | - | - | - | - | - | - | 13,505 | 2,026 | 15,531 | 15,531 | - | - | - | - | - | - | - | - | - | 211,579 |
| 1b.4 | Subtotal Period 1b Period-Dependent Costs | 38 | 851 | 7 | 3 | - | 29 | 30,149 | 4,513 | 35,590 | 34,123 | 1,467 | - | 356 | - | - | - | - | 7,122 | 12 | 336,037 |
| 1b.0 | TOTAL PERIOD 1b COST | 3,795 | 4,613 | 440 | 475 | 178 | 5,354 | 41,023 | 9,641 | 65,519 | 62,317 | 2,278 | 924 | 6,132 | 13,351 | 588 | - | - | 597,873 | 45,493 | 377,612 |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table E-1
Prairie Island DECON Unit 1
DECON Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|--|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| PERIOD 1 TOTALS | | 3,795 | 5,980 | 452 | 480 | 178 | 5,404 | 118,348 | 20,903 | 155,540 | 147,480 | 6,468 | 1,592 | 6,132 | 13,961 | 588 | - | - | 610,063 | 45,513 | 1,000,729 |
| PERIOD 2a - Large Component Removal | | | | | | | | | | | | | | | | | | | | | |
| Period 2a Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| Nuclear Steam Supply System Removal | | | | | | | | | | | | | | | | | | | | | |
| 2a.1.1.1 | Reactor Coolant Piping | 54 | 47 | 10 | 18 | - | 187 | - | 89 | 406 | 406 | - | - | - | 508 | - | - | - | 35,411 | 1,421 | - |
| 2a.1.1.2 | Pressurizer Relief Tank | 24 | 21 | 6 | 12 | - | 125 | - | 51 | 238 | 238 | - | - | - | 338 | - | - | - | 23,594 | 630 | - |
| 2a.1.1.3 | Reactor Coolant Pumps & Motors | 57 | 68 | 110 | 93 | - | 463 | - | 186 | 977 | 977 | - | - | - | 2,332 | - | - | - | 295,800 | 2,049 | 100 |
| 2a.1.1.4 | Pressurizer | - | 77 | 503 | 97 | - | 776 | - | 278 | 1,732 | 1,732 | - | - | - | 2,196 | - | - | - | 185,015 | 1,666 | 938 |
| 2a.1.1.5 | Steam Generators | - | 3,307 | 2,269 | 1,770 | 2,409 | 4,001 | - | 2,681 | 16,437 | 16,437 | - | - | 18,672 | 11,316 | - | - | - | 1,689,435 | 11,613 | 2,875 |
| 2a.1.1.6 | CRDMs/ICIs/Service Structure Removal | 302 | 281 | 218 | 66 | - | 938 | - | 488 | 2,294 | 2,294 | - | - | - | 4,797 | - | - | - | 177,400 | 8,104 | - |
| 2a.1.1.7 | Reactor Vessel Internals | 82 | 4,861 | 13,621 | 929 | - | 9,015 | 307 | 11,878 | 40,693 | 40,693 | - | - | - | 501 | 125 | 673 | - | 164,987 | 25,123 | 1,163 |
| 2a.1.1.8 | Reactor Vessel | 94 | 6,046 | 2,028 | 728 | - | 2,975 | 307 | 6,804 | 18,982 | 18,982 | - | - | - | 8,073 | - | - | - | 576,524 | 25,123 | 1,163 |
| 2a.1.1 | Totals | 613 | 14,709 | 18,764 | 3,714 | 2,409 | 18,480 | 614 | 22,455 | 81,759 | 81,759 | - | - | 18,672 | 30,062 | 125 | 673 | - | 3,148,166 | 75,729 | 6,240 |
| Removal of Major Equipment | | | | | | | | | | | | | | | | | | | | | |
| 2a.1.2 | Main Turbine/Generator | - | 331 | 172 | 64 | 527 | 377 | - | 283 | 1,752 | 1,752 | - | - | 2,131 | 1,187 | - | - | - | 203,265 | 4,667 | - |
| 2a.1.3 | Main Condensers | - | 2,801 | 109 | 62 | 705 | 533 | - | 960 | 5,170 | 5,170 | - | - | 3,800 | 1,587 | - | - | - | 271,824 | 39,151 | - |
| Cascading Costs from Clean Building Demolition | | | | | | | | | | | | | | | | | | | | | |
| 2a.1.4.1 | Reactor | - | 794 | - | - | - | - | - | 119 | 913 | 913 | - | - | - | - | - | - | - | - | 7,589 | - |
| 2a.1.4 | Totals | - | 794 | - | - | - | - | - | 119 | 913 | 913 | - | - | - | - | - | - | - | - | 7,589 | - |
| Disposal of Plant Systems | | | | | | | | | | | | | | | | | | | | | |
| 2a.1.5.1 | Air Removal | - | 31 | - | - | - | - | - | 5 | 36 | - | - | 36 | - | - | - | - | - | - | 452 | - |
| 2a.1.5.2 | Auxiliary Feedwater | - | 46 | - | - | - | - | - | 7 | 53 | - | - | 53 | - | - | - | - | - | - | 670 | - |
| 2a.1.5.3 | Auxiliary Feedwater - RCA | - | 47 | 0 | 2 | 36 | - | - | 17 | 102 | 102 | - | - | 215 | - | - | - | - | 8,722 | 601 | - |
| 2a.1.5.4 | Bleed Steam | - | 90 | - | - | - | - | - | 14 | 104 | - | - | 104 | - | - | - | - | - | - | 1,335 | - |
| 2a.1.5.5 | Caustic Addition - RCA | - | 38 | 0 | 2 | 39 | - | - | 16 | 95 | 95 | - | - | 233 | - | - | - | - | 9,453 | 444 | - |
| 2a.1.5.6 | Chemical Feed | - | 20 | - | - | - | - | - | 3 | 23 | - | - | 23 | - | - | - | - | - | - | 304 | - |
| 2a.1.5.7 | Chemical Feed - RCA | - | 1 | 0 | 0 | 1 | - | - | 0 | 3 | 3 | - | - | 6 | - | - | - | - | 243 | 12 | - |
| 2a.1.5.8 | Circulating Water | - | 42 | - | - | - | - | - | 6 | 49 | - | - | 49 | - | - | - | - | - | - | 619 | - |
| 2a.1.5.9 | Condensate | - | 474 | - | - | - | - | - | 71 | 545 | - | - | 545 | - | - | - | - | - | - | 6,837 | - |
| 2a.1.5.10 | Condensate Polishing | - | 235 | - | - | - | - | - | 35 | 271 | - | - | 271 | - | - | - | - | - | - | 3,420 | - |
| 2a.1.5.11 | Condensate Polishing - RCA | - | 183 | 4 | 15 | 348 | - | - | 101 | 651 | 651 | - | - | 2,078 | - | - | - | - | 84,395 | 2,329 | - |
| 2a.1.5.12 | Electro-hydraulic | - | 9 | - | - | - | - | - | 1 | 10 | - | - | 10 | - | - | - | - | - | - | 127 | - |
| 2a.1.5.13 | Feedwater | - | 153 | - | - | - | - | - | 23 | 175 | - | - | 175 | - | - | - | - | - | - | 2,215 | - |
| 2a.1.5.14 | Feedwater - RCA | - | 195 | 7 | 24 | 537 | - | - | 133 | 895 | 895 | - | - | 3,208 | - | - | - | - | 130,294 | 2,651 | - |
| 2a.1.5.15 | Gland Seal | - | 34 | - | - | - | - | - | 5 | 39 | - | - | 39 | - | - | - | - | - | - | 505 | - |
| 2a.1.5.16 | Heater Drain | - | 400 | - | - | - | - | - | 60 | 460 | - | - | 460 | - | - | - | - | - | - | 5,881 | - |
| 2a.1.5.17 | Internal Circ Water & CDSR | - | 27 | - | - | - | - | - | 4 | 31 | - | - | 31 | - | - | - | - | - | - | 389 | - |
| 2a.1.5.18 | Main Gen/Exciter/Transformer | - | 0 | - | - | - | - | - | 0 | 0 | - | - | 0 | - | - | - | - | - | - | 5 | - |
| 2a.1.5.19 | Main Steam | - | 115 | - | - | - | - | - | 17 | 133 | - | - | 133 | - | - | - | - | - | - | 1,690 | - |
| 2a.1.5.20 | Main Steam - RCA | - | 366 | 10 | 37 | 844 | - | - | 225 | 1,482 | 1,482 | - | - | 5,044 | - | - | - | - | 204,825 | 4,956 | - |
| 2a.1.5.21 | Steam Generator Blowdown | - | 478 | 22 | 29 | 340 | 234 | - | 235 | 1,337 | 1,337 | - | - | 2,031 | 686 | - | - | - | 126,640 | 6,667 | - |
| 2a.1.5.22 | Steam Generators | - | 5 | - | - | - | - | - | 1 | 6 | - | - | 6 | - | - | - | - | - | - | 75 | - |
| 2a.1.5.23 | Turbine & Moisture Separators | - | 386 | - | - | - | - | - | 58 | 444 | - | - | 444 | - | - | - | - | - | - | 5,609 | - |
| 2a.1.5.24 | Turbine Oil Purification | - | 70 | - | - | - | - | - | 11 | 81 | - | - | 81 | - | - | - | - | - | - | 1,003 | - |
| 2a.1.5 | Totals | - | 3,445 | 44 | 108 | 2,144 | 234 | - | 1,048 | 7,023 | 4,565 | - | 2,458 | 12,815 | 686 | - | - | - | 564,572 | 48,794 | - |
| 2a.1.6 | Scaffolding in support of decommissioning | - | 930 | 3 | 1 | 26 | 4 | - | 238 | 1,202 | 1,202 | - | - | 138 | 12 | - | - | - | 6,985 | 6,368 | - |
| 2a.1 | Subtotal Period 2a Activity Costs | 613 | 23,011 | 19,092 | 3,950 | 5,810 | 19,628 | 614 | 25,102 | 97,819 | 95,362 | - | 2,458 | 37,556 | 33,533 | 125 | 673 | - | 4,194,811 | 182,298 | 6,240 |
| Period 2a Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 2a.2.1 | Retired RPV Upper Internals Package | - | 257 | 387 | 217 | - | 1,394 | - | 1,041 | 3,296 | 3,296 | - | - | - | 376 | 112 | - | - | 50,164 | 3,333 | 133 |
| 2a.2 | Subtotal Period 2a Additional Costs | - | 257 | 387 | 217 | - | 1,394 | - | 1,041 | 3,296 | 3,296 | - | - | - | 376 | 112 | - | - | 50,164 | 3,333 | 133 |
| Period 2a Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 2a.3.1 | Process decommissioning water waste | 48 | - | 32 | 58 | - | 130 | - | 68 | 337 | 337 | - | - | - | 299 | - | - | - | 17,968 | 58 | - |
| 2a.3.3 | Small tool allowance | - | 239 | - | - | - | - | - | 36 | 274 | 247 | - | 27 | - | - | - | - | - | - | - | - |
| 2a.3.4 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 1,639 | 246 | 1,885 | - | 1,885 | - | - | - | - | - | - | - | - | - |
| 2a.3.5 | Retention and Severance | - | - | - | - | - | - | 12,780 | 1,917 | 14,697 | 14,697 | - | - | - | - | - | - | - | - | - | - |
| 2a.3.6 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 1,780 | - | 1,780 | - | 1,780 | - | - | - | - | - | - | - | - | - |
| 2a.3.7 | On-site survey and release of 0.0 tons clean metallic waste | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 2a.3 | Subtotal Period 2a Collateral Costs | 48 | 239 | 32 | 58 | - | 130 | 16,198 | 2,267 | 18,972 | 15,281 | 3,664 | 27 | - | 299 | - | - | - | 17,968 | 58 | - |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table E-1
Prairie Island DECON Unit 1
DECON Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| Period 2a Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 2a.4.1 | Decon supplies | 107 | - | - | - | - | - | - | 27 | 134 | 134 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.2 | Insurance | - | - | - | - | - | - | 690 | 69 | 759 | 759 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.3 | Property taxes | - | - | - | - | - | - | 5,009 | 501 | 5,510 | 5,510 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.4 | Health physics supplies | - | 1,950 | - | - | - | - | - | 487 | 2,437 | 2,437 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.5 | Heavy equipment rental | - | 3,565 | - | - | - | - | - | 535 | 4,100 | 4,100 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.6 | Disposal of DAW generated | - | - | 73 | 30 | - | 303 | - | 88 | 493 | 493 | - | - | - | 3,681 | - | - | - | 73,619 | 120 | - |
| 2a.4.7 | Plant energy budget | - | - | - | - | - | - | 2,194 | 329 | 2,523 | 2,523 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.8 | NRC Fees | - | - | - | - | - | - | 842 | 84 | 926 | 926 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.9 | Emergency Planning Fees | - | - | - | - | - | - | 2,647 | 265 | 2,912 | - | 2,912 | - | - | - | - | - | - | - | - | - |
| 2a.4.10 | Fixed Overhead | - | - | - | - | - | - | 1,695 | 254 | 1,949 | 1,949 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.11 | Spent Fuel Pool O&M | - | - | - | - | - | - | 602 | 90 | 692 | - | 692 | - | - | - | - | - | - | - | - | - |
| 2a.4.12 | ISFSI Operating Costs | - | - | - | - | - | - | 80 | 12 | 92 | - | 92 | - | - | - | - | - | - | - | - | - |
| 2a.4.13 | Railroad Track Maintenance | - | - | - | - | - | - | 318 | 48 | 366 | 366 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.14 | Remedial Actions Surveys | - | - | - | - | - | - | 1,596 | 239 | 1,835 | 1,835 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.15 | Security Staff Cost | - | - | - | - | - | - | 11,727 | 1,759 | 13,486 | 13,486 | - | - | - | - | - | - | - | - | - | 172,726 |
| 2a.4.16 | DOC Staff Cost | - | - | - | - | - | - | 20,663 | 3,099 | 23,763 | 23,763 | - | - | - | - | - | - | - | - | - | 225,210 |
| 2a.4.17 | Utility Staff Cost | - | - | - | - | - | - | 26,905 | 4,036 | 30,941 | 30,941 | - | - | - | - | - | - | - | - | - | 417,453 |
| 2a.4 | Subtotal Period 2a Period-Dependent Costs | 107 | 5,515 | 73 | 30 | - | 303 | 74,968 | 11,922 | 92,918 | 89,223 | 3,696 | - | - | 3,681 | - | - | - | 73,619 | 120 | 815,389 |
| 2a.0 | TOTAL PERIOD 2a COST | 768 | 29,021 | 19,584 | 4,254 | 5,810 | 21,456 | 91,780 | 40,333 | 213,006 | 203,161 | 7,360 | 2,485 | 37,556 | 37,889 | 237 | 673 | - | 4,336,562 | 185,810 | 821,762 |
| PERIOD 2b - Site Decontamination | | | | | | | | | | | | | | | | | | | | | |
| Period 2b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| Disposal of Plant Systems | | | | | | | | | | | | | | | | | | | | | |
| 2b.1.1.1 | Aux Bldg Normal Ventilation | - | 2 | 0 | 0 | 1 | - | - | 1 | 3 | 3 | - | - | 3 | - | - | - | - | 140 | 29 | - |
| 2b.1.1.2 | Battery Rm Special Ventilation | - | 0 | - | - | - | - | - | 0 | 0 | - | - | 0 | - | - | - | - | - | - | 6 | - |
| 2b.1.1.3 | Buildings Maintenance | - | 5 | - | - | - | - | - | 1 | 5 | - | - | 5 | - | - | - | - | - | - | 65 | - |
| 2b.1.1.4 | Chemical & Volume Control | 1,120 | 1,389 | 89 | 90 | 753 | 973 | - | 1,286 | 5,700 | 5,700 | - | - | 4,498 | 2,846 | - | - | - | 366,565 | 34,533 | - |
| 2b.1.1.5 | Component Cooling - RCA | - | 858 | 25 | 91 | 2,079 | - | - | 543 | 3,597 | 3,597 | - | - | 12,427 | - | - | - | - | 504,675 | 11,242 | - |
| 2b.1.1.6 | Containment Cooling | - | 74 | - | - | - | - | - | 11 | 85 | - | - | 85 | - | - | - | - | - | - | 1,086 | - |
| 2b.1.1.7 | Containment Cooling - RCA | - | 304 | 7 | 25 | 569 | - | - | 166 | 1,070 | 1,070 | - | - | 3,400 | - | - | - | - | 138,090 | 3,971 | - |
| 2b.1.1.8 | Containment Hydrogen Control - RCA | - | 30 | 0 | 1 | 18 | - | - | 10 | 59 | 59 | - | - | 105 | - | - | - | - | 4,278 | 401 | - |
| 2b.1.1.9 | Containment Spray - RCA | - | 93 | 2 | 6 | 145 | - | - | 46 | 293 | 293 | - | - | 868 | - | - | - | - | 35,249 | 1,217 | - |
| 2b.1.1.10 | Containment Ventilation | - | 255 | 24 | 51 | 828 | 248 | - | 260 | 1,667 | 1,667 | - | - | 4,951 | 737 | - | - | - | 247,952 | 3,668 | - |
| 2b.1.1.11 | Cooling Water | - | 163 | - | - | - | - | - | 24 | 187 | - | - | 187 | - | - | - | - | - | - | 2,396 | - |
| 2b.1.1.12 | Cooling Water - RCA | - | 658 | 16 | 57 | 1,293 | - | - | 368 | 2,392 | 2,392 | - | - | 7,728 | - | - | - | - | 313,832 | 8,594 | - |
| 2b.1.1.13 | D1 Emergency Diesel | - | 50 | - | - | - | - | - | 8 | 58 | - | - | 58 | - | - | - | - | - | - | 730 | - |
| 2b.1.1.14 | D2 Emergency Diesel | - | 36 | - | - | - | - | - | 5 | 41 | - | - | 41 | - | - | - | - | - | - | 522 | - |
| 2b.1.1.15 | Diesel Rooms Ventilation | - | 9 | - | - | - | - | - | 1 | 11 | - | - | 11 | - | - | - | - | - | - | 135 | - |
| 2b.1.1.16 | Electrical - Clean | - | 1,905 | - | - | - | - | - | 286 | 2,191 | - | - | 2,191 | - | - | - | - | - | - | 26,981 | - |
| 2b.1.1.17 | Electrical - Contaminated | - | 611 | 7 | 20 | 423 | 32 | - | 228 | 1,321 | 1,321 | - | - | 2,527 | 95 | - | - | - | 108,690 | 8,377 | - |
| 2b.1.1.18 | Electrical - Decontaminated | - | 3,787 | 48 | 173 | 3,940 | - | - | 1,569 | 9,518 | 9,518 | - | - | 23,551 | - | - | - | - | 956,401 | 49,378 | - |
| 2b.1.1.19 | Fuel Handling | - | 121 | 6 | 11 | 152 | 73 | - | 74 | 436 | 436 | - | - | 908 | 218 | - | - | - | 50,723 | 1,784 | - |
| 2b.1.1.20 | Fuel Oil | - | 121 | - | - | - | - | - | 18 | 140 | - | - | 140 | - | - | - | - | - | - | 1,697 | - |
| 2b.1.1.21 | HVAC - Clean | - | 120 | - | - | - | - | - | 18 | 138 | - | - | 138 | - | - | - | - | - | - | 1,891 | - |
| 2b.1.1.22 | HVAC - Contaminated | - | 374 | 9 | 26 | 546 | 41 | - | 190 | 1,186 | 1,186 | - | - | 3,261 | 123 | - | - | - | 140,257 | 5,032 | - |
| 2b.1.1.23 | Incore Instrumentation | 0 | 28 | 1 | 2 | 10 | 19 | - | 14 | 74 | 74 | - | - | 60 | 57 | - | - | - | 6,058 | 425 | - |
| 2b.1.1.24 | Misc Drains & Vents | - | 233 | 15 | 13 | 65 | 176 | - | 115 | 618 | 618 | - | - | 390 | 514 | - | - | - | 49,062 | 3,091 | - |
| 2b.1.1.25 | Reactor Coolant | 153 | 311 | 21 | 18 | 58 | 265 | - | 234 | 1,060 | 1,060 | - | - | 344 | 777 | - | - | - | 64,085 | 6,470 | - |
| 2b.1.1.26 | Reactor Hot Sampling | 149 | 136 | 12 | 7 | 11 | 118 | - | 142 | 576 | 576 | - | - | 66 | 342 | - | - | - | 25,063 | 3,946 | - |
| 2b.1.1.27 | Reactor Makeup | - | 73 | - | - | - | - | - | 11 | 84 | - | - | 84 | - | - | - | - | - | - | 1,042 | - |
| 2b.1.1.28 | Reactor Vessel | 9 | 21 | 1 | 0 | 4 | 5 | - | 12 | 52 | 52 | - | - | 26 | 14 | - | - | - | 2,000 | 425 | - |
| 2b.1.1.29 | Residual Heat Removal | 357 | 419 | 85 | 86 | 484 | 1,105 | - | 654 | 3,190 | 3,190 | - | - | 2,895 | 3,252 | - | - | - | 326,425 | 7,621 | - |
| 2b.1.1.30 | Safeguards Chilled Water | - | 18 | - | - | - | - | - | 3 | 20 | - | - | 20 | - | - | - | - | - | - | 259 | - |
| 2b.1.1.31 | Safety Injection | - | 893 | 42 | 73 | 1,136 | 393 | - | 507 | 3,044 | 3,044 | - | - | 6,788 | 1,156 | - | - | - | 349,908 | 12,561 | - |
| 2b.1.1.32 | Sampling | - | 60 | 4 | 3 | 10 | 37 | - | 26 | 140 | 140 | - | - | 59 | 107 | - | - | - | 9,420 | 811 | - |
| 2b.1.1.33 | Shield Bldg Ventilation | - | 140 | 14 | 26 | 360 | 165 | - | 135 | 839 | 839 | - | - | 2,152 | 491 | - | - | - | 118,583 | 2,030 | - |
| 2b.1.1.34 | Station & Instrument Air | - | 20 | - | - | - | - | - | 3 | 23 | - | - | 23 | - | - | - | - | - | - | 300 | - |
| 2b.1.1.35 | Station & Instrument Air - RCA | - | 81 | 1 | 2 | 56 | - | - | 29 | 169 | 169 | - | - | 332 | - | - | - | - | 13,496 | 1,053 | - |
| 2b.1.1.36 | Turbine Bldg Traps & Drains | - | 50 | - | - | - | - | - | 8 | 58 | - | - | 58 | - | - | - | - | - | - | 767 | - |
| 2b.1.1.37 | Unit Coolers | - | 42 | - | - | - | - | - | 6 | 49 | - | - | 49 | - | - | - | - | - | - | 611 | - |
| 2b.1.1.38 | Unit Coolers - RCA | - | 55 | 0 | 2 | 39 | - | - | 20 | 115 | 115 | - | - | 230 | - | - | - | - | 9,348 | 683 | - |
| 2b.1.1 | Totals | 1,789 | 13,544 | 429 | 786 | 12,979 | 3,651 | - | 7,032 | 40,209 | 37,119 | - | 3,091 | 77,571 | 10,728 | - | - | - | 3,840,299 | 205,829 | - |
| 2b.1.2 | Scaffolding in support of decommissioning | - | 1,163 | 4 | 2 | 32 | 5 | - | 297 | 1,503 | 1,503 | - | - | 173 | 15 | - | - | - | 8,731 | 7,960 | - |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table E-1
Prairie Island DECON Unit 1
DECON Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|--|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|---------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| Decontamination of Site Buildings | | | | | | | | | | | | | | | | | | | | | | |
| 2b.1.3.1 | Reactor | 1,215 | 2,807 | 240 | 1,236 | 373 | 13,624 | - | 4,981 | 24,476 | 24,476 | - | - | 2,230 | 83,429 | - | - | - | - | 3,633,417 | 50,950 | - |
| 2b.1.3.2 | Backwash Waste Receiving Tank | - | 28 | 3 | 17 | - | 97 | - | 34 | 179 | 179 | - | - | - | 929 | - | - | - | - | 43,896 | 301 | - |
| 2b.1.3 | Totals | 1,215 | 2,835 | 243 | 1,253 | 373 | 13,721 | - | 5,015 | 24,655 | 24,655 | - | - | 2,230 | 84,358 | - | - | - | - | 3,677,313 | 51,251 | - |
| 2b.1.4 | Prepare/submit License Termination Plan | - | - | - | - | - | - | 526 | 79 | 605 | 605 | - | - | - | - | - | - | - | - | - | - | 4,096 |
| 2b.1.5 | Receive NRC approval of termination plan | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - | - |
| 2b.1 | Subtotal Period 2b Activity Costs | 3,004 | 17,542 | 675 | 2,041 | 13,384 | 17,377 | 526 | 12,423 | 66,973 | 63,882 | - | 3,091 | 79,974 | 95,101 | - | - | - | - | 7,526,343 | 265,040 | 4,096 |
| Period 2b Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 2b.2.1 | Operational Equipment | - | - | 11 | 36 | 606 | - | - | 97 | 751 | 751 | - | - | 5,880 | - | - | - | - | - | 147,000 | 16 | - |
| 2b.2.2 | Excavation of Underground Services | - | 1,175 | - | - | - | - | 225 | 328 | 1,728 | 1,728 | - | - | - | - | - | - | - | - | - | 7,411 | - |
| 2b.2.3 | Security Modifications | - | - | - | - | - | - | 4,348 | 652 | 5,000 | 5,000 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.2 | Subtotal Period 2b Additional Costs | - | 1,175 | 11 | 36 | 606 | - | 4,573 | 1,077 | 7,478 | 7,478 | - | - | 5,880 | - | - | - | - | - | 147,000 | 7,427 | - |
| Period 2b Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 2b.3.1 | Process decommissioning water waste | 108 | - | 74 | 132 | - | 298 | - | 156 | 768 | 768 | - | - | - | 684 | - | - | - | - | 41,053 | 133 | - |
| 2b.3.2 | Process decommissioning chemical flush waste | 2 | - | 90 | 296 | - | 677 | - | 224 | 1,289 | 1,289 | - | - | - | 875 | - | - | - | - | 93,252 | 164 | - |
| 2b.3.3 | Small tool allowance | - | 315 | - | - | - | - | - | 47 | 362 | 362 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.3.4 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 10,782 | 1,617 | 12,400 | - | 12,400 | - | - | - | - | - | - | - | - | - | - |
| 2b.3.5 | Retention and Severance | - | - | - | - | - | - | 6,141 | 921 | 7,063 | 7,063 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.3.6 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 1,348 | - | 1,348 | - | 1,348 | - | - | - | - | - | - | - | - | - | - |
| 2b.3 | Subtotal Period 2b Collateral Costs | 110 | 315 | 164 | 428 | - | 975 | 18,272 | 2,965 | 23,230 | 9,482 | 13,748 | - | - | 1,559 | - | - | - | - | 134,305 | 297 | - |
| Period 2b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 2b.4.1 | Decon supplies | 511 | - | - | - | - | - | - | 128 | 639 | 639 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.2 | Insurance | - | - | - | - | - | - | 523 | 52 | 575 | 575 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.3 | Property taxes | - | - | - | - | - | - | 3,435 | 344 | 3,779 | 3,779 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.4 | Health physics supplies | - | 2,140 | - | - | - | - | - | 535 | 2,675 | 2,675 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.5 | Heavy equipment rental | - | 2,774 | - | - | - | - | - | 416 | 3,190 | 3,190 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.6 | Disposal of DAW generated | - | - | 70 | 28 | - | 290 | - | 84 | 472 | 472 | - | - | - | 3,521 | - | - | - | - | 70,425 | 115 | - |
| 2b.4.7 | Plant energy budget | - | - | - | - | - | - | 1,313 | 197 | 1,509 | 1,509 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.8 | NRC Fees | - | - | - | - | - | - | 638 | 64 | 701 | 701 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.9 | Emergency Planning Fees | - | - | - | - | - | - | 2,006 | 201 | 2,207 | - | 2,207 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.10 | Fixed Overhead | - | - | - | - | - | - | 1,284 | 193 | 1,477 | 1,477 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.11 | Spent Fuel Pool O&M | - | - | - | - | - | - | 456 | 68 | 524 | - | 524 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.12 | Liquid Radwaste Processing Equipment/Services | - | - | - | - | - | - | 229 | 34 | 264 | 264 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.13 | ISFSI Operating Costs | - | - | - | - | - | - | 60 | 9 | 69 | - | 69 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.14 | Railroad Track Maintenance | - | - | - | - | - | - | 67 | 10 | 78 | 78 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.15 | Remedial Actions Surveys | - | - | - | - | - | - | 1,209 | 181 | 1,391 | 1,391 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.16 | Security Staff Cost | - | - | - | - | - | - | 8,259 | 1,239 | 9,497 | 9,497 | - | - | - | - | - | - | - | - | - | - | 121,244 |
| 2b.4.17 | DOC Staff Cost | - | - | - | - | - | - | 10,738 | 1,611 | 12,348 | 12,348 | - | - | - | - | - | - | - | - | - | - | 121,244 |
| 2b.4.18 | Utility Staff Cost | - | - | - | - | - | - | 13,928 | 2,089 | 16,017 | 16,017 | - | - | - | - | - | - | - | - | - | - | 225,649 |
| 2b.4 | Subtotal Period 2b Period-Dependent Costs | 511 | 4,914 | 70 | 28 | - | 290 | 44,145 | 7,454 | 57,412 | 54,612 | 2,800 | - | - | 3,521 | - | - | - | - | 70,425 | 115 | 468,137 |
| 2b.0 | TOTAL PERIOD 2b COST | 3,626 | 23,946 | 920 | 2,533 | 13,990 | 18,642 | 67,516 | 23,920 | 155,093 | 135,455 | 16,548 | 3,091 | 85,854 | 100,182 | - | - | - | - | 7,878,073 | 272,879 | 472,233 |
| PERIOD 2c - Spent fuel delay prior to SFP decon | | | | | | | | | | | | | | | | | | | | | | |
| Period 2c Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Period 2c Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 2c.3.1 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 53,816 | 8,072 | 61,889 | - | 61,889 | - | - | - | - | - | - | - | - | - | - |
| 2c.3.2 | Retention and Severance | - | - | - | - | - | - | 3,512 | 527 | 4,039 | 4,039 | - | - | - | - | - | - | - | - | - | - | - |
| 2c.3.3 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 1,526 | - | 1,526 | - | 1,526 | - | - | - | - | - | - | - | - | - | - |
| 2c.3 | Subtotal Period 2c Collateral Costs | - | - | - | - | - | - | 58,855 | 8,599 | 67,455 | 4,039 | 63,415 | - | - | - | - | - | - | - | - | - | - |
| Period 2c Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 2c.4.1 | Insurance | - | - | - | - | - | - | 592 | 59 | 651 | 651 | - | - | - | - | - | - | - | - | - | - | - |
| 2c.4.2 | Property taxes | - | - | - | - | - | - | 3,512 | 351 | 3,863 | 3,863 | - | - | - | - | - | - | - | - | - | - | - |
| 2c.4.3 | Health physics supplies | - | 263 | - | - | - | - | - | 66 | 328 | 328 | - | - | - | - | - | - | - | - | - | - | - |
| 2c.4.4 | Disposal of DAW generated | - | - | 9 | 4 | - | 38 | - | 11 | 61 | 61 | - | - | - | 457 | - | - | - | - | 9,141 | 15 | - |
| 2c.4.5 | Plant energy budget | - | - | - | - | - | - | 1,486 | 223 | 1,709 | 1,709 | - | - | - | - | - | - | - | - | - | - | - |
| 2c.4.6 | NRC Fees | - | - | - | - | - | - | 687 | 69 | 756 | 756 | - | - | - | - | - | - | - | - | - | - | - |
| 2c.4.7 | Emergency Planning Fees | - | - | - | - | - | - | 2,271 | 227 | 2,498 | - | 2,498 | - | - | - | - | - | - | - | - | - | - |
| 2c.4.8 | Fixed Overhead | - | - | - | - | - | - | 1,454 | 218 | 1,672 | 1,672 | - | - | - | - | - | - | - | - | - | - | - |
| 2c.4.9 | Spent Fuel Pool O&M | - | - | - | - | - | - | 516 | 77 | 593 | - | 593 | - | - | - | - | - | - | - | - | - | - |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table E-1
Prairie Island DECON Unit 1
DECON Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| Period 2c Period-Dependent Costs (continued) | | | | | | | | | | | | | | | | | | | | | |
| 2c.4.10 | Liquid Radwaste Processing Equipment/Services | - | - | - | - | - | - | 260 | 39 | 298 | 298 | - | - | - | - | - | - | - | - | - | - |
| 2c.4.11 | ISFSI Operating Costs | - | - | - | - | - | - | 68 | 10 | 79 | - | 79 | - | - | - | - | - | - | - | - | - |
| 2c.4.12 | Railroad Track Maintenance | - | - | - | - | - | - | 76 | 11 | 88 | 88 | - | - | - | - | - | - | - | - | - | - |
| 2c.4.13 | Security Staff Cost | - | - | - | - | - | - | 9,348 | 1,402 | 10,751 | 10,751 | - | - | - | - | - | - | - | - | - | 137,246 |
| 2c.4.14 | Utility Staff Cost | - | - | - | - | - | - | 1,195 | 179 | 1,375 | 1,375 | - | - | - | - | - | - | - | - | - | 19,062 |
| 2c.4 | Subtotal Period 2c Period-Dependent Costs | - | 263 | 9 | 4 | - | 38 | 21,465 | 2,943 | 24,721 | 21,552 | 3,170 | - | - | 457 | - | - | - | 9,141 | 15 | 156,308 |
| 2c.0 | TOTAL PERIOD 2c COST | - | 263 | 9 | 4 | - | 38 | 80,320 | 11,543 | 92,176 | 25,591 | 66,585 | - | - | 457 | - | - | - | 9,141 | 15 | 156,308 |
| PERIOD 2d - Decontamination Following Wet Fuel Storage | | | | | | | | | | | | | | | | | | | | | |
| Period 2d Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| 2d.1.1 | Remove spent fuel racks | 347 | 35 | 86 | 41 | - | 703 | - | 373 | 1,585 | 1,585 | - | - | - | 2,092 | - | - | - | 132,919 | 576 | - |
| Disposal of Plant Systems | | | | | | | | | | | | | | | | | | | | | |
| 2d.1.2.1 | Electrical - Contaminated - Fuel Pool | - | 152 | 2 | 5 | 103 | 8 | - | 56 | 325 | 325 | - | - | 615 | 23 | - | - | - | 26,449 | 2,077 | - |
| 2d.1.2.2 | Electrical - Decontaminated - Fuel Pool | - | 947 | 12 | 43 | 986 | - | - | 392 | 2,380 | 2,380 | - | - | 5,893 | - | - | - | - | 239,327 | 12,340 | - |
| 2d.1.2.3 | HVAC - Contaminated - Fuel Pool | - | 160 | 4 | 11 | 234 | 18 | - | 82 | 508 | 508 | - | - | 1,398 | 53 | - | - | - | 60,110 | 2,157 | - |
| 2d.1.2.4 | Safeguards Chilled Water - RCA | - | 85 | 1 | 4 | 83 | - | - | 34 | 207 | 207 | - | - | 495 | - | - | - | - | 20,100 | 1,019 | - |
| 2d.1.2.5 | Spent Fuel Pool Cooling | 303 | 357 | 34 | 32 | 135 | 450 | - | 382 | 1,693 | 1,693 | - | - | 806 | 1,325 | - | - | - | 117,816 | 7,613 | - |
| 2d.1.2.6 | Station & Instrument Air - RCA Fuel Pool | - | 20 | 0 | 1 | 14 | - | - | 7 | 42 | 42 | - | - | 83 | - | - | - | - | 3,374 | 263 | - |
| 2d.1.2 | Totals | 303 | 1,721 | 52 | 96 | 1,554 | 476 | - | 954 | 5,157 | 5,157 | - | - | 9,290 | 1,401 | - | - | - | 467,176 | 25,468 | - |
| 2d.1.4 | Scaffolding in support of decommissioning | - | 233 | 1 | 0 | 6 | 1 | - | 59 | 301 | 301 | - | - | 35 | 3 | - | - | - | 1,746 | 1,592 | - |
| 2d.1 | Subtotal Period 2d Activity Costs | 650 | 1,989 | 139 | 138 | 1,561 | 1,180 | - | 1,386 | 7,042 | 7,042 | - | - | 9,325 | 3,496 | - | - | - | 601,841 | 27,637 | - |
| Period 2d Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 2d.2.1 | License Termination Survey Planning | - | - | - | - | - | - | 1,037 | 311 | 1,348 | 1,348 | - | - | - | - | - | - | - | - | - | 6,240 |
| 2d.2 | Subtotal Period 2d Additional Costs | - | - | - | - | - | - | 1,037 | 311 | 1,348 | 1,348 | - | - | - | - | - | - | - | - | - | 6,240 |
| Period 2d Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 2d.3.1 | Process decommissioning water waste | 30 | - | 21 | 38 | - | 86 | - | 44 | 220 | 220 | - | - | - | 197 | - | - | - | 11,793 | 38 | - |
| 2d.3.2 | Process decommissioning chemical flush waste | 1 | - | 34 | 110 | - | 251 | - | 83 | 478 | 478 | - | - | - | 324 | - | - | - | 34,576 | 61 | - |
| 2d.3.3 | Small tool allowance | - | 37 | - | - | - | - | - | 6 | 42 | 42 | - | - | - | - | - | - | - | - | - | - |
| 2d.3.4 | Decommissioning Equipment Disposition | - | - | 130 | 67 | 1,112 | 178 | - | 234 | 1,722 | 1,722 | - | - | 6,000 | 529 | - | - | - | 303,608 | 147 | - |
| 2d.3.5 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 975 | - | 975 | - | 975 | - | - | - | - | - | - | - | - | - |
| 2d.3 | Subtotal Period 2d Collateral Costs | 31 | 37 | 185 | 215 | 1,112 | 514 | 975 | 367 | 3,437 | 2,462 | 975 | - | 6,000 | 1,050 | - | - | - | 349,977 | 246 | - |
| Period 2d Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 2d.4.1 | Decon supplies | 59 | - | - | - | - | - | - | 15 | 73 | 73 | - | - | - | - | - | - | - | - | - | - |
| 2d.4.2 | Insurance | - | - | - | - | - | - | 378 | 38 | 416 | 416 | - | - | - | - | - | - | - | - | - | - |
| 2d.4.3 | Property taxes | - | - | - | - | - | - | 2,004 | 200 | 2,204 | 2,204 | - | - | - | - | - | - | - | - | - | - |
| 2d.4.4 | Health physics supplies | - | 575 | - | - | - | - | - | 144 | 719 | 719 | - | - | - | - | - | - | - | - | - | - |
| 2d.4.5 | Heavy equipment rental | - | 2,007 | - | - | - | - | - | 301 | 2,308 | 2,308 | - | - | - | - | - | - | - | - | - | - |
| 2d.4.6 | Disposal of DAW generated | - | - | 16 | 7 | - | 68 | - | 20 | 111 | 111 | - | - | 830 | - | - | - | - | 16,609 | 27 | - |
| 2d.4.7 | Plant energy budget | - | - | - | - | - | - | 506 | 76 | 582 | 582 | - | - | - | - | - | - | - | - | - | - |
| 2d.4.8 | NRC Fees | - | - | - | - | - | 439 | - | 44 | 483 | 483 | - | - | - | - | - | - | - | - | - | - |
| 2d.4.9 | Emergency Planning Fees | - | - | - | - | - | 58 | - | 6 | 64 | - | 64 | - | - | - | - | - | - | - | - | - |
| 2d.4.10 | Fixed Overhead | - | - | - | - | - | - | 929 | 139 | 1,068 | 1,068 | - | - | - | - | - | - | - | - | - | - |
| 2d.4.11 | Liquid Radwaste Processing Equipment/Services | - | - | - | - | - | - | 332 | 50 | 381 | 381 | - | - | - | - | - | - | - | - | - | - |
| 2d.4.12 | ISFSI Operating Costs | - | - | - | - | - | - | 44 | 7 | 50 | - | 50 | - | - | - | - | - | - | - | - | - |
| 2d.4.13 | Railroad Track Maintenance | - | - | - | - | - | - | 49 | 7 | 56 | 56 | - | - | - | - | - | - | - | - | - | - |
| 2d.4.14 | Remedial Actions Surveys | - | - | - | - | - | - | 875 | 131 | 1,006 | 1,006 | - | - | - | - | - | - | - | - | - | - |
| 2d.4.15 | Security Staff Cost | - | - | - | - | - | - | 5,782 | 867 | 6,649 | 4,694 | 1,955 | - | - | - | - | - | - | - | - | 84,454 |
| 2d.4.16 | DOC Staff Cost | - | - | - | - | - | - | 6,401 | 960 | 7,361 | 7,361 | - | - | - | - | - | - | - | - | - | 70,243 |
| 2d.4.17 | Utility Staff Cost | - | - | - | - | - | - | 8,100 | 1,215 | 9,315 | 8,858 | 456 | - | - | - | - | - | - | - | - | 126,681 |
| 2d.4 | Subtotal Period 2d Period-Dependent Costs | 59 | 2,582 | 16 | 7 | - | 68 | 25,896 | 4,220 | 32,848 | 30,323 | 2,525 | - | - | 830 | - | - | - | 16,609 | 27 | 281,377 |
| 2d.0 | TOTAL PERIOD 2d COST | 740 | 4,608 | 340 | 360 | 2,673 | 1,763 | 27,908 | 6,284 | 44,675 | 41,175 | 3,501 | - | 15,325 | 5,377 | - | - | - | 968,427 | 27,910 | 287,617 |
| PERIOD 2f - License Termination | | | | | | | | | | | | | | | | | | | | | |
| Period 2f Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| 2f.1.1 | ORISE confirmatory survey | - | - | - | - | - | - | 166 | 50 | 216 | 216 | - | - | - | - | - | - | - | - | - | - |
| 2f.1.2 | Terminate license | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 2f.1 | Subtotal Period 2f Activity Costs | - | - | - | - | - | - | 166 | 50 | 216 | 216 | - | - | - | - | - | - | - | - | - | - |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table E-1
Prairie Island DECON Unit 1
DECON Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|---|---|--------------|---------------|-----------------|-----------------|---------------------------|---------------------|----------------|-------------------|----------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|---------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| Period 2f Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 2f.2.1 | License Termination Survey | - | - | - | - | - | - | 3,199 | 960 | 4,159 | 4,159 | - | - | - | - | - | - | - | - | - | 40,531 | 3,120 |
| 2f.2 | Subtotal Period 2f Additional Costs | - | - | - | - | - | - | 3,199 | 960 | 4,159 | 4,159 | - | - | - | - | - | - | - | - | - | 40,531 | 3,120 |
| Period 2f Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 2f.3.1 | DOC staff relocation expenses | - | - | - | - | - | - | 1,264 | 190 | 1,454 | 1,454 | - | - | - | - | - | - | - | - | - | - | - |
| 2f.3.2 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 934 | - | 934 | - | 934 | - | - | - | - | - | - | - | - | - | - |
| 2f.3 | Subtotal Period 2f Collateral Costs | - | - | - | - | - | - | 2,198 | 190 | 2,388 | 1,454 | 934 | - | - | - | - | - | - | - | - | - | - |
| Period 2f Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 2f.4.1 | Insurance | - | - | - | - | - | - | 362 | 36 | 398 | 398 | - | - | - | - | - | - | - | - | - | - | - |
| 2f.4.2 | Property taxes | - | - | - | - | - | - | 1,771 | 177 | 1,948 | 1,948 | - | - | - | - | - | - | - | - | - | - | - |
| 2f.4.3 | Health physics supplies | - | 501 | - | - | - | - | - | 125 | 626 | 626 | - | - | - | - | - | - | - | - | - | - | - |
| 2f.4.4 | Disposal of DAW generated | - | - | 7 | 3 | - | 28 | - | 8 | 45 | 45 | - | - | 334 | - | - | - | - | - | 6,685 | 11 | - |
| 2f.4.5 | Plant energy budget | - | - | - | - | - | - | 243 | 36 | 279 | 279 | - | - | - | - | - | - | - | - | - | - | - |
| 2f.4.6 | NRC Fees | - | - | - | - | - | - | 422 | 42 | 465 | 465 | - | - | - | - | - | - | - | - | - | - | - |
| 2f.4.7 | Emergency Planning Fees | - | - | - | - | - | - | 55 | 6 | 61 | - | 61 | - | - | - | - | - | - | - | - | - | - |
| 2f.4.8 | Fixed Overhead | - | - | - | - | - | - | 890 | 133 | 1,023 | 1,023 | - | - | - | - | - | - | - | - | - | - | - |
| 2f.4.9 | ISFSI Operating Costs | - | - | - | - | - | - | 42 | 6 | 48 | - | 48 | - | - | - | - | - | - | - | - | - | - |
| 2f.4.10 | Railroad Track Maintenance | - | - | - | - | - | - | 47 | 7 | 54 | 54 | - | - | - | - | - | - | - | - | - | - | - |
| 2f.4.11 | Security Staff Cost | - | - | - | - | - | - | 5,538 | 831 | 6,369 | 4,497 | 1,873 | - | - | - | - | - | - | - | - | - | 80,898 |
| 2f.4.12 | DOC Staff Cost | - | - | - | - | - | - | 4,238 | 636 | 4,874 | 4,874 | - | - | - | - | - | - | - | - | - | - | 46,283 |
| 2f.4.13 | Utility Staff Cost | - | - | - | - | - | - | 4,011 | 602 | 4,613 | 4,175 | 438 | - | - | - | - | - | - | - | - | - | 59,507 |
| 2f.4 | Subtotal Period 2f Period-Dependent Costs | - | 501 | 7 | 3 | - | 28 | 17,620 | 2,646 | 20,803 | 18,384 | 2,420 | - | 334 | - | - | - | - | - | 6,685 | 11 | 186,687 |
| 2f.0 | TOTAL PERIOD 2f COST | - | 501 | 7 | 3 | - | 28 | 23,183 | 3,845 | 27,566 | 24,212 | 3,354 | - | - | 334 | - | - | - | - | 6,685 | 40,542 | 189,807 |
| PERIOD 2 TOTALS | | 5,134 | 58,338 | 20,860 | 7,153 | 22,473 | 41,926 | 290,708 | 85,924 | 532,517 | 429,593 | 97,348 | 5,576 | 138,734 | 144,239 | 237 | 673 | - | 13,198,890 | 527,156 | 1,927,726 | |
| PERIOD 3b - Site Restoration | | | | | | | | | | | | | | | | | | | | | | |
| Period 3b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Demolition of Remaining Site Buildings | | | | | | | | | | | | | | | | | | | | | | |
| 3b.1.1.1 | Reactor | - | 4,644 | - | - | - | - | - | 697 | 5,341 | - | - | 5,341 | - | - | - | - | - | - | - | 44,669 | - |
| 3b.1.1.2 | Condensate Storage Tank Foundation | - | 3 | - | - | - | - | - | 0 | 4 | - | - | 4 | - | - | - | - | - | - | - | 16 | - |
| 3b.1.1.3 | Structures below 3' below grade | - | 1,651 | - | - | - | - | - | 248 | 1,899 | - | - | 1,899 | - | - | - | - | - | - | - | 8,411 | - |
| 3b.1.1.4 | Turbine | - | 2,139 | - | - | - | - | - | 321 | 2,460 | - | - | 2,460 | - | - | - | - | - | - | - | 21,985 | - |
| 3b.1.1.5 | Turbine Pedestal | - | 365 | - | - | - | - | - | 55 | 420 | - | - | 420 | - | - | - | - | - | - | - | 1,857 | - |
| 3b.1.1 | Totals | - | 8,803 | - | - | - | - | - | 1,320 | 10,123 | - | - | 10,123 | - | - | - | - | - | - | - | 76,939 | - |
| Site Closeout Activities | | | | | | | | | | | | | | | | | | | | | | |
| 3b.1.2 | Grade & landscape site | - | 448 | - | - | - | - | - | 67 | 515 | - | - | 515 | - | - | - | - | - | - | - | 921 | - |
| 3b.1.3 | Final report to NRC | - | - | - | - | - | - | 200 | 30 | 231 | 231 | - | - | - | - | - | - | - | - | - | - | 1,560 |
| 3b.1 | Subtotal Period 3b Activity Costs | - | 9,251 | - | - | - | - | 200 | 1,418 | 10,869 | 231 | - | 10,639 | - | - | - | - | - | - | - | 77,859 | 1,560 |
| Period 3b Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3b.2.1 | Clean Concrete Disposal | - | 2,242 | - | - | - | - | 5 | 337 | 2,583 | - | - | 2,583 | - | - | - | - | - | - | - | 8,386 | - |
| 3b.2.2 | Intake Structure cofferdam | - | 623 | - | - | - | - | - | 93 | 716 | - | - | 716 | - | - | - | - | - | - | - | 5,168 | - |
| 3b.2.3 | Construction Debris | - | - | - | - | - | - | 10 | 2 | 12 | - | - | 12 | - | - | - | - | - | - | - | - | - |
| 3b.2.4 | Backfill | - | 3,011 | - | - | - | - | - | 452 | 3,462 | - | - | 3,462 | - | - | - | - | - | - | - | 2,904 | - |
| 3b.2.5 | Disposition of Original Casks | - | 24 | 80 | 418 | - | 2,390 | - | 728 | 3,640 | 3,640 | - | - | - | 8,929 | - | - | - | - | 1,059,612 | 146 | - |
| 3b.2 | Subtotal Period 3b Additional Costs | - | 5,899 | 80 | 418 | - | 2,390 | 15 | 1,611 | 10,413 | 3,640 | - | 6,773 | - | 8,929 | - | - | - | - | 1,059,612 | 16,604 | - |
| Period 3b Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3b.3.1 | Small tool allowance | - | 121 | - | - | - | - | - | 18 | 139 | - | - | 139 | - | - | - | - | - | - | - | - | - |
| 3b.3.2 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 2,649 | - | 2,649 | - | 2,649 | - | - | - | - | - | - | - | - | - | - |
| 3b.3 | Subtotal Period 3b Collateral Costs | - | 121 | - | - | - | - | 2,649 | 18 | 2,787 | - | 2,649 | 139 | - | - | - | - | - | - | - | - | - |
| Period 3b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3b.4.1 | Insurance | - | - | - | - | - | - | 513 | 51 | 565 | 565 | - | - | - | - | - | - | - | - | - | - | - |
| 3b.4.2 | Property taxes | - | - | - | - | - | - | 4,167 | 417 | 4,583 | - | 4,583 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.3 | Heavy equipment rental | - | 7,144 | - | - | - | - | - | 1,072 | 8,215 | - | - | 8,215 | - | - | - | - | - | - | - | - | - |
| 3b.4.4 | Plant energy budget | - | - | - | - | - | - | 344 | 52 | 395 | - | 395 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.5 | NRC ISFSI Fees | - | - | - | - | - | - | 218 | 22 | 239 | - | - | 239 | - | - | - | - | - | - | - | - | - |
| 3b.4.6 | Emergency Planning Fees | - | - | - | - | - | - | 157 | 16 | 173 | - | 173 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.7 | Fixed Overhead | - | - | - | - | - | - | 1,024 | 154 | 1,178 | 397 | 781 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.8 | ISFSI Operating Costs | - | - | - | - | - | - | 119 | 18 | 136 | - | 136 | - | - | - | - | - | - | - | - | - | - |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table E-1
Prairie Island DECON Unit 1
DECON Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| Period 3b Period-Dependent Costs (continued) | | | | | | | | | | | | | | | | | | | | | |
| 3b.4.9 | Railroad Track Maintenance | - | - | - | - | - | - | 361 | 54 | 416 | 153 | 263 | - | - | - | - | - | - | - | - | - |
| 3b.4.10 | Security Staff Cost | - | - | - | - | - | - | 4,616 | 692 | 5,308 | - | 5,308 | - | - | - | - | - | - | - | - | 57,340 |
| 3b.4.11 | DOC Staff Cost | - | - | - | - | - | - | 10,921 | 1,638 | 12,559 | - | - | 12,559 | - | - | - | - | - | - | - | 116,885 |
| 3b.4.12 | Utility Staff Cost | - | - | - | - | - | - | 5,170 | 776 | 5,946 | - | 1,278 | 4,668 | - | - | - | - | - | - | - | 76,637 |
| 3b.4 | Subtotal Period 3b Period-Dependent Costs | - | 7,144 | - | - | - | - | 27,610 | 4,960 | 39,714 | 1,114 | 13,158 | 25,442 | - | - | - | - | - | - | - | 250,861 |
| 3b.0 | TOTAL PERIOD 3b COST | - | 22,414 | 80 | 418 | - | 2,390 | 30,474 | 8,008 | 63,784 | 4,985 | 15,807 | 42,993 | - | 8,929 | - | - | - | 1,059,612 | 94,463 | 252,421 |
| PERIOD 3c - Fuel Storage Operations/Shipping | | | | | | | | | | | | | | | | | | | | | |
| Period 3c Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| Period 3c Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 3c.3.1 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 270,755 | 40,613 | 311,368 | - | 311,368 | - | - | - | - | - | - | - | - | - |
| 3c.3.2 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 94,360 | - | 94,360 | - | 94,360 | - | - | - | - | - | - | - | - | - |
| 3c.3 | Subtotal Period 3c Collateral Costs | - | - | - | - | - | - | 365,115 | 40,613 | 405,728 | - | 405,728 | - | - | - | - | - | - | - | - | - |
| Period 3c Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 3c.4.1 | Insurance | - | - | - | - | - | - | 18,290 | 1,829 | 20,119 | - | 20,119 | - | - | - | - | - | - | - | - | - |
| 3c.4.2 | Property taxes | - | - | - | - | - | - | 104,580 | 10,458 | 115,038 | - | 115,038 | - | - | - | - | - | - | - | - | - |
| 3c.4.3 | Plant energy budget | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 3c.4.4 | NRC ISFSI Fees | - | - | - | - | - | - | 9,306 | 931 | 10,237 | - | 10,237 | - | - | - | - | - | - | - | - | - |
| 3c.4.5 | Emergency Planning Fees | - | - | - | - | - | - | 5,600 | 560 | 6,160 | - | 6,160 | - | - | - | - | - | - | - | - | - |
| 3c.4.6 | Fixed Overhead | - | - | - | - | - | - | 12,308 | 1,846 | 14,155 | - | 14,155 | - | - | - | - | - | - | - | - | - |
| 3c.4.7 | ISFSI Operating Costs | - | - | - | - | - | - | 4,228 | 634 | 4,862 | - | 4,862 | - | - | - | - | - | - | - | - | - |
| 3c.4.8 | Railroad Track Maintenance | - | - | - | - | - | - | 4,723 | 708 | 5,431 | - | 5,431 | - | - | - | - | - | - | - | - | - |
| 3c.4.9 | Security Staff Cost | - | - | - | - | - | - | 164,428 | 24,664 | 189,092 | - | 189,092 | - | - | - | - | - | - | - | - | 2,042,594 |
| 3c.4.10 | DOC Staff Cost | - | - | - | - | - | - | 11,579 | 1,737 | 13,316 | - | 13,316 | - | - | - | - | - | - | - | - | 78,561 |
| 3c.4.11 | Utility Staff Cost | - | - | - | - | - | - | 71,292 | 10,694 | 81,986 | - | 81,986 | - | - | - | - | - | - | - | - | 1,040,937 |
| 3c.4 | Subtotal Period 3c Period-Dependent Costs | - | - | - | - | - | - | 406,334 | 54,061 | 460,395 | - | 460,395 | - | - | - | - | - | - | - | - | 3,162,093 |
| 3c.0 | TOTAL PERIOD 3c COST | - | - | - | - | - | - | 771,448 | 94,674 | 866,123 | - | 866,123 | - | - | - | - | - | - | - | - | 3,162,093 |
| PERIOD 3d - GTCC shipping | | | | | | | | | | | | | | | | | | | | | |
| Period 3d Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| Nuclear Steam Supply System Removal | | | | | | | | | | | | | | | | | | | | | |
| 3d.1.1.1 | Vessel & Internals GTCC Disposal | - | - | 1,444 | - | - | 8,680 | - | 1,663 | 11,787 | 11,787 | - | - | - | - | - | - | 1,773 | 344,823 | - | - |
| 3d.1.1 | Totals | - | - | 1,444 | - | - | 8,680 | - | 1,663 | 11,787 | 11,787 | - | - | - | - | - | - | 1,773 | 344,823 | - | - |
| 3d.1 | Subtotal Period 3d Activity Costs | - | - | 1,444 | - | - | 8,680 | - | 1,663 | 11,787 | 11,787 | - | - | - | - | - | - | 1,773 | 344,823 | - | - |
| Period 3d Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 3d.3.1 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 28 | 4 | 32 | - | 32 | - | - | - | - | - | - | - | - | - |
| 3d.3.2 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 48 | - | 48 | - | 48 | - | - | - | - | - | - | - | - | - |
| 3d.3 | Subtotal Period 3d Collateral Costs | - | - | - | - | - | - | 76 | 4 | 80 | - | 80 | - | - | - | - | - | - | - | - | - |
| Period 3d Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 3d.4.1 | Insurance | - | - | - | - | - | - | 9 | 1 | 10 | 10 | - | - | - | - | - | - | - | - | - | - |
| 3d.4.2 | Property taxes | - | - | - | - | - | - | 53 | 5 | 58 | 58 | - | - | - | - | - | - | - | - | - | - |
| 3d.4.4 | NRC ISFSI Fees | - | - | - | - | - | - | 4 | 0 | 4 | - | 4 | - | - | - | - | - | - | - | - | - |
| 3d.4.5 | Emergency Planning Fees | - | - | - | - | - | - | 3 | 0 | 3 | - | 3 | - | - | - | - | - | - | - | - | - |
| 3d.4.6 | Fixed Overhead | - | - | - | - | - | - | 6 | 1 | 7 | - | 7 | - | - | - | - | - | - | - | - | - |
| 3d.4.7 | Railroad Track Maintenance | - | - | - | - | - | - | 2 | 0 | 3 | - | 3 | - | - | - | - | - | - | - | - | - |
| 3d.4.8 | Security Staff Cost | - | - | - | - | - | - | 83 | 13 | 96 | - | 96 | - | - | - | - | - | - | - | - | 1,037 |
| 3d.4.9 | Utility Staff Cost | - | - | - | - | - | - | 19 | 3 | 22 | - | 22 | - | - | - | - | - | - | - | - | 269 |
| 3d.4 | Subtotal Period 3d Period-Dependent Costs | - | - | - | - | - | - | 181 | 24 | 204 | 197 | 7 | - | - | - | - | - | - | - | - | 1,306 |
| 3d.0 | TOTAL PERIOD 3d COST | - | - | 1,444 | - | - | 8,680 | 256 | 1,691 | 12,071 | 11,984 | 87 | - | - | - | - | - | 1,773 | 344,823 | - | 1,306 |
| PERIOD 3e - ISFSI Decontamination | | | | | | | | | | | | | | | | | | | | | |
| Period 3e Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| Period 3e Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 3e.2.1 | License Termination ISFSI | - | 0 | 2 | 17 | - | 142 | 1,197 | 339 | 1,696 | 1,696 | - | - | - | 424 | - | - | - | 65,754 | 5,882 | 1,161 |
| 3e.2 | Subtotal Period 3e Additional Costs | - | 0 | 2 | 17 | - | 142 | 1,197 | 339 | 1,696 | 1,696 | - | - | - | 424 | - | - | - | 65,754 | 5,882 | 1,161 |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table E-1
Prairie Island DECON Unit 1
DECON Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|-------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| Period 3e Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3e.4.1 | Insurance | - | - | - | - | - | - | 93 | 23 | 116 | 116 | - | - | - | - | - | - | - | - | - | - | |
| 3e.4.2 | Property taxes | - | - | - | - | - | - | 56 | 14 | 69 | 69 | - | - | - | - | - | - | - | - | - | - | |
| 3e.4.3 | Plant energy budget | - | - | - | - | - | - | 11 | 3 | 13 | 13 | - | - | - | - | - | - | - | - | - | - | |
| 3e.4.4 | Fixed Overhead | - | - | - | - | - | - | 54 | 14 | 68 | 68 | - | - | - | - | - | - | - | - | - | - | |
| 3e.4.5 | Railroad Track Maintenance | - | - | - | - | - | - | 21 | 5 | 26 | 26 | - | - | - | - | - | - | - | - | - | - | |
| 3e.4.6 | Security Staff Cost | - | - | - | - | - | - | 174 | 43 | 217 | 217 | - | - | - | - | - | - | - | - | - | 2,500 | |
| 3e.4.7 | Utility Staff Cost | - | - | - | - | - | - | 129 | 32 | 161 | 161 | - | - | - | - | - | - | - | - | - | 1,896 | |
| 3e.4 | Subtotal Period 3e Period-Dependent Costs | - | - | - | - | - | - | 536 | 134 | 670 | 670 | - | - | - | - | - | - | - | - | - | 4,396 | |
| 3e.0 | TOTAL PERIOD 3e COST | - | 0 | 2 | 17 | - | 142 | 1,733 | 473 | 2,367 | 2,367 | - | - | - | 424 | - | - | - | - | 65,754 | 5,882 | 5,556 |
| PERIOD 3f - ISFSI Site Restoration | | | | | | | | | | | | | | | | | | | | | | |
| Period 3f Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Period 3f Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3f.2.1 | Demolition and Site Restoration of ISFSI | - | 1,121 | - | - | - | - | 161 | 192 | 1,474 | - | - | 1,474 | - | - | - | - | - | - | - | 4,846 | 80 |
| 3f.2 | Subtotal Period 3f Additional Costs | - | 1,121 | - | - | - | - | 161 | 192 | 1,474 | - | - | 1,474 | - | - | - | - | - | - | - | 4,846 | 80 |
| Period 3f Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3f.3.1 | Small tool allowance | - | 7 | - | - | - | - | - | 1 | 8 | - | - | 8 | - | - | - | - | - | - | - | - | - |
| 3f.3 | Subtotal Period 3f Collateral Costs | - | 7 | - | - | - | - | - | 1 | 8 | - | - | 8 | - | - | - | - | - | - | - | - | - |
| Period 3f Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3f.4.2 | Property taxes | - | - | - | - | - | - | 28 | 3 | 31 | - | - | 31 | - | - | - | - | - | - | - | - | - |
| 3f.4.3 | Heavy equipment rental | - | 59 | - | - | - | - | - | 9 | 68 | - | - | 68 | - | - | - | - | - | - | - | - | - |
| 3f.4.4 | Plant energy budget | - | - | - | - | - | - | 6 | 1 | 6 | - | - | 6 | - | - | - | - | - | - | - | - | - |
| 3f.4.5 | Fixed Overhead | - | - | - | - | - | - | 28 | 4 | 32 | - | - | 32 | - | - | - | - | - | - | - | - | - |
| 3f.4.6 | Railroad Track Maintenance | - | - | - | - | - | - | 11 | 2 | 12 | - | - | 12 | - | - | - | - | - | - | - | - | - |
| 3f.4.7 | Security Staff Cost | - | - | - | - | - | - | 89 | 13 | 102 | - | - | 102 | - | - | - | - | - | - | - | - | 1,281 |
| 3f.4.8 | Utility Staff Cost | - | - | - | - | - | - | 55 | 8 | 63 | - | - | 63 | - | - | - | - | - | - | - | - | 795 |
| 3f.4 | Subtotal Period 3f Period-Dependent Costs | - | 59 | - | - | - | - | 216 | 40 | 315 | - | - | 315 | - | - | - | - | - | - | - | - | 2,076 |
| 3f.0 | TOTAL PERIOD 3f COST | - | 1,187 | - | - | - | - | 377 | 233 | 1,798 | - | - | 1,798 | - | - | - | - | - | - | - | 4,846 | 2,156 |
| PERIOD 3 TOTALS | | - | 23,601 | 1,525 | 435 | - | 11,212 | 804,289 | 105,079 | 946,142 | 19,335 | 882,017 | 44,790 | - | 9,353 | - | - | 1,773 | 1,470,189 | 105,190 | 3,423,532 | |
| TOTAL COST TO DECOMMISSION | | 8,929 | 87,919 | 22,838 | 8,068 | 22,651 | 58,542 | 1,213,346 | 211,907 | 1,634,199 | 596,408 | 985,833 | 51,958 | 144,866 | 167,553 | 826 | 673 | 1,773 | 15,279,140 | 677,859 | 6,351,987 | |

| | |
|--|--|
| TOTAL COST TO DECOMMISSION WITH 14.9% CONTINGENCY: | \$1,634,199 thousands of 2020 dollars |
| TOTAL NRC LICENSE TERMINATION COST IS 36.5% OR: | \$596,408 thousands of 2020 dollars |
| SPENT FUEL MANAGEMENT COST IS 60.33% OR: | \$985,833 thousands of 2020 dollars |
| NON-NUCLEAR DEMOLITION COST IS 3.18% OR: | \$51,958 thousands of 2020 dollars |
| TOTAL LOW-LEVEL RADIOACTIVE WASTE VOLUME BURIED (EXCLUDING GTCC): | 169,051 Cubic Feet |
| TOTAL GREATER THAN CLASS C RADWASTE VOLUME GENERATED: | 1,773 Cubic Feet |
| TOTAL SCRAP METAL REMOVED: | 32,925 Tons |
| TOTAL CRAFT LABOR REQUIREMENTS: | 677,859 Man-hours |

End Notes:
n/a - indicates that this activity not charged as decommissioning expense
a - indicates that this activity performed by decommissioning staff
0 - indicates that this value is less than 0.5 but is non-zero
A cell containing " - " indicates a zero value

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table E-2
Prairie Island DECON Unit 2
DECON Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|--|--|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| PERIOD 1a - Shutdown through Transition | | | | | | | | | | | | | | | | | | | | | |
| Period 1a Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| 1a.1.1 | Prepare preliminary decommissioning cost | - | - | - | - | - | - | 71 | 11 | 82 | 82 | - | - | - | - | - | - | - | - | - | 556 |
| 1a.1.2 | Notification of Cessation of Operations | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.3 | Remove fuel & source material | - | - | - | - | - | - | - | - | n/a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.4 | Notification of Permanent Defueling | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.5 | Deactivate plant systems & process waste | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.6 | Prepare and submit PSDAR | - | - | - | - | - | - | 110 | 16 | 126 | 126 | - | - | - | - | - | - | - | - | - | 855 |
| 1a.1.7 | Review plant dwgs & specs. | - | - | - | - | - | - | 253 | 38 | 291 | 291 | - | - | - | - | - | - | - | - | - | 1,967 |
| 1a.1.8 | Perform detailed rad survey | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.9 | Estimate by-product inventory | - | - | - | - | - | - | 55 | 8 | 63 | 63 | - | - | - | - | - | - | - | - | - | 428 |
| 1a.1.10 | End product description | - | - | - | - | - | - | 55 | 8 | 63 | 63 | - | - | - | - | - | - | - | - | - | 428 |
| 1a.1.11 | Detailed by-product inventory | - | - | - | - | - | - | 71 | 11 | 82 | 82 | - | - | - | - | - | - | - | - | - | 556 |
| 1a.1.12 | Define major work sequence | - | - | - | - | - | - | 412 | 62 | 474 | 474 | - | - | - | - | - | - | - | - | - | 3,207 |
| 1a.1.13 | Perform SER and EA | - | - | - | - | - | - | 170 | 26 | 196 | 196 | - | - | - | - | - | - | - | - | - | 1,326 |
| 1a.1.14 | Prepare/submit Defueled Technical Specifications | - | - | - | - | - | - | 412 | 62 | 474 | 474 | - | - | - | - | - | - | - | - | - | 3,207 |
| 1a.1.15 | Perform Site-Specific Cost Study | - | - | - | - | - | - | 275 | 41 | 316 | 316 | - | - | - | - | - | - | - | - | - | 2,138 |
| 1a.1.16 | Prepare/submit Irradiated Fuel Management Plan | - | - | - | - | - | - | 55 | 8 | 63 | 63 | - | - | - | - | - | - | - | - | - | 428 |
| Activity Specifications | | | | | | | | | | | | | | | | | | | | | |
| 1a.1.17.1 | Plant & temporary facilities | - | - | - | - | - | - | 270 | 41 | 311 | 280 | - | 31 | - | - | - | - | - | - | - | 2,104 |
| 1a.1.17.2 | Plant systems | - | - | - | - | - | - | 229 | 34 | 263 | 237 | - | 26 | - | - | - | - | - | - | - | 1,782 |
| 1a.1.17.3 | NSSS Decontamination Flush | - | - | - | - | - | - | 27 | 4 | 32 | 32 | - | - | - | - | - | - | - | - | - | 214 |
| 1a.1.17.4 | Reactor internals | - | - | - | - | - | - | 390 | 59 | 449 | 449 | - | - | - | - | - | - | - | - | - | 3,036 |
| 1a.1.17.5 | Reactor vessel | - | - | - | - | - | - | 357 | 54 | 411 | 411 | - | - | - | - | - | - | - | - | - | 2,779 |
| 1a.1.17.6 | Biological shield | - | - | - | - | - | - | 27 | 4 | 32 | 32 | - | - | - | - | - | - | - | - | - | 214 |
| 1a.1.17.7 | Steam generators | - | - | - | - | - | - | 171 | 26 | 197 | 197 | - | - | - | - | - | - | - | - | - | 1,334 |
| 1a.1.17.8 | Reinforced concrete | - | - | - | - | - | - | 88 | 13 | 101 | 51 | - | 51 | - | - | - | - | - | - | - | 684 |
| 1a.1.17.9 | Main Turbine | - | - | - | - | - | - | 22 | 3 | 25 | - | - | 25 | - | - | - | - | - | - | - | 171 |
| 1a.1.17.10 | Main Condensers | - | - | - | - | - | - | 22 | 3 | 25 | - | - | 25 | - | - | - | - | - | - | - | 171 |
| 1a.1.17.11 | Plant structures & buildings | - | - | - | - | - | - | 171 | 26 | 197 | 99 | - | 99 | - | - | - | - | - | - | - | 1,334 |
| 1a.1.17.12 | Waste management | - | - | - | - | - | - | 253 | 38 | 291 | 291 | - | - | - | - | - | - | - | - | - | 1,967 |
| 1a.1.17.13 | Facility & site closeout | - | - | - | - | - | - | 49 | 7 | 57 | 28 | - | 28 | - | - | - | - | - | - | - | 385 |
| 1a.1.17 | Total | - | - | - | - | - | - | 2,079 | 312 | 2,391 | 2,105 | - | 286 | - | - | - | - | - | - | - | 16,175 |
| Planning & Site Preparations | | | | | | | | | | | | | | | | | | | | | |
| 1a.1.18 | Prepare dismantling sequence | - | - | - | - | - | - | 132 | 20 | 152 | 152 | - | - | - | - | - | - | - | - | - | 1,026 |
| 1a.1.19 | Plant prep. & temp. svces | - | - | - | - | - | - | 3,500 | 525 | 4,025 | 4,025 | - | - | - | - | - | - | - | - | - | - |
| 1a.1.20 | Design water clean-up system | - | - | - | - | - | - | 77 | 12 | 88 | 88 | - | - | - | - | - | - | - | - | - | 599 |
| 1a.1.21 | Rigging/Cont. Cntrl Envlp/ooling/etc. | - | - | - | - | - | - | 2,400 | 360 | 2,760 | 2,760 | - | - | - | - | - | - | - | - | - | - |
| 1a.1.22 | Procure casks/liners & containers | - | - | - | - | - | - | 68 | 10 | 78 | 78 | - | - | - | - | - | - | - | - | - | 526 |
| 1a.1 | Subtotal Period 1a Activity Costs | - | - | - | - | - | - | 10,195 | 1,529 | 11,724 | 11,439 | - | 286 | - | - | - | - | - | - | - | 33,420 |
| Period 1a Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 1a.2.1 | Spent Fuel Pool Isolation | - | - | - | - | - | - | 8,450 | 1,268 | 9,718 | 9,718 | - | - | - | - | - | - | - | - | - | - |
| 1a.2 | Subtotal Period 1a Additional Costs | - | - | - | - | - | - | 8,450 | 1,268 | 9,718 | 9,718 | - | - | - | - | - | - | - | - | - | - |
| Period 1a Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 1a.3.1 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 1,330 | 199 | 1,529 | - | 1,529 | - | - | - | - | - | - | - | - | - |
| 1a.3.2 | Retention and Severance | - | - | - | - | - | - | 8,394 | 1,259 | 9,653 | 9,653 | - | - | - | - | - | - | - | - | - | - |
| 1a.3.3 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 1,249 | - | 1,249 | - | 1,249 | - | - | - | - | - | - | - | - | - |
| 1a.3 | Subtotal Period 1a Collateral Costs | - | - | - | - | - | - | 10,973 | 1,459 | 12,432 | 9,653 | 2,779 | - | - | - | - | - | - | - | - | - |
| Period 1a Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 1a.4.1 | Insurance | - | - | - | - | - | - | 1,660 | 166 | 1,826 | 1,826 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.2 | Property taxes | - | - | - | - | - | - | 3,623 | 362 | 3,985 | 3,985 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.3 | Health physics supplies | - | 578 | - | - | - | - | - | 144 | 722 | 722 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.4 | Heavy equipment rental | - | 753 | - | - | - | - | - | 113 | 866 | 866 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.5 | Disposal of DAW generated | - | - | 11 | 5 | - | 47 | - | 13 | 76 | 76 | - | - | 565 | - | - | - | - | 11,299 | 18 | - |
| 1a.4.6 | Plant energy budget | - | - | - | - | - | - | 1,621 | 243 | 1,864 | 1,864 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.7 | NRC Fees | - | - | - | - | - | - | 638 | 64 | 702 | 702 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.8 | Emergency Planning Fees | - | - | - | - | - | - | 2,174 | 217 | 2,392 | - | 2,392 | - | - | - | - | - | - | - | - | - |
| 1a.4.9 | Fixed Overhead | - | - | - | - | - | - | 1,440 | 216 | 1,656 | 1,656 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.10 | Spent Fuel Pool O&M | - | - | - | - | - | - | 422 | 63 | 486 | 486 | - | 486 | - | - | - | - | - | - | - | - |
| 1a.4.11 | ISFSI Operating Costs | - | - | - | - | - | - | 56 | 8 | 64 | - | 64 | - | - | - | - | - | - | - | - | - |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table E-2
Prairie Island DECON Unit 2
DECON Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|--|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| Period 1a Period-Dependent Costs (continued) | | | | | | | | | | | | | | | | | | | | | |
| 1a.4.12 | Railroad Track Maintenance | - | - | - | - | - | - | 63 | 9 | 72 | 72 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.13 | Security Staff Cost | - | - | - | - | - | - | 8,328 | 1,249 | 9,577 | 9,577 | - | - | - | - | - | - | - | - | - | 122,720 |
| 1a.4.14 | Utility Staff Cost | - | - | - | - | - | - | 21,681 | 3,252 | 24,933 | 24,933 | - | - | - | - | - | - | - | - | - | 345,280 |
| 1a.4 | Subtotal Period 1a Period-Dependent Costs | - | 1,331 | 11 | 5 | - | 47 | 41,706 | 6,122 | 49,221 | 46,279 | 2,942 | - | - | 565 | - | - | - | 11,299 | 18 | 468,000 |
| 1a.0 | TOTAL PERIOD 1a COST | - | 1,331 | 11 | 5 | - | 47 | 71,324 | 10,377 | 83,095 | 77,089 | 5,720 | 286 | - | 565 | - | - | - | 11,299 | 18 | 501,420 |
| PERIOD 1b - Decommissioning Preparations | | | | | | | | | | | | | | | | | | | | | |
| Period 1b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| Detailed Work Procedures | | | | | | | | | | | | | | | | | | | | | |
| 1b.1.1.1 | Plant systems | - | - | - | - | - | - | 260 | 39 | 299 | 269 | - | 30 | - | - | - | - | - | - | - | 2,024 |
| 1b.1.1.2 | NSSS Decontamination Flush | - | - | - | - | - | - | 55 | 8 | 63 | 63 | - | - | - | - | - | - | - | - | - | 428 |
| 1b.1.1.3 | Reactor internals | - | - | - | - | - | - | 137 | 21 | 158 | 158 | - | - | - | - | - | - | - | - | - | 1,069 |
| 1b.1.1.4 | Remaining buildings | - | - | - | - | - | - | 74 | 11 | 85 | 21 | - | 64 | - | - | - | - | - | - | - | 577 |
| 1b.1.1.5 | CRD cooling assembly | - | - | - | - | - | - | 55 | 8 | 63 | 63 | - | - | - | - | - | - | - | - | - | 428 |
| 1b.1.1.6 | CRD housings & ICI tubes | - | - | - | - | - | - | 55 | 8 | 63 | 63 | - | - | - | - | - | - | - | - | - | 428 |
| 1b.1.1.7 | Incore instrumentation | - | - | - | - | - | - | 55 | 8 | 63 | 63 | - | - | - | - | - | - | - | - | - | 428 |
| 1b.1.1.8 | Reactor vessel | - | - | - | - | - | - | 199 | 30 | 229 | 229 | - | - | - | - | - | - | - | - | - | 1,552 |
| 1b.1.1.9 | Facility closeout | - | - | - | - | - | - | 66 | 10 | 76 | 38 | - | 38 | - | - | - | - | - | - | - | 513 |
| 1b.1.1.10 | Missile shields | - | - | - | - | - | - | 25 | 4 | 28 | 28 | - | - | - | - | - | - | - | - | - | 192 |
| 1b.1.1.11 | Biological shield | - | - | - | - | - | - | 66 | 10 | 76 | 76 | - | - | - | - | - | - | - | - | - | 513 |
| 1b.1.1.12 | Steam generators | - | - | - | - | - | - | 253 | 38 | 291 | 291 | - | - | - | - | - | - | - | - | - | 1,967 |
| 1b.1.1.13 | Reinforced concrete | - | - | - | - | - | - | 55 | 8 | 63 | 32 | - | 32 | - | - | - | - | - | - | - | 428 |
| 1b.1.1.14 | Main Turbine | - | - | - | - | - | - | 86 | 13 | 99 | - | - | 99 | - | - | - | - | - | - | - | 667 |
| 1b.1.1.15 | Main Condensers | - | - | - | - | - | - | 86 | 13 | 99 | - | - | 99 | - | - | - | - | - | - | - | 667 |
| 1b.1.1.16 | Auxiliary building | - | - | - | - | - | - | 150 | 23 | 173 | 155 | - | 17 | - | - | - | - | - | - | - | 1,167 |
| 1b.1.1.17 | Reactor building | - | - | - | - | - | - | 150 | 23 | 173 | 155 | - | 17 | - | - | - | - | - | - | - | 1,167 |
| 1b.1.1 | Total | - | - | - | - | - | - | 1,827 | 274 | 2,101 | 1,706 | - | 395 | - | - | - | - | - | - | - | 14,215 |
| 1b.1.2 | Decon primary loop | 572 | - | - | - | - | - | - | 286 | 859 | 859 | - | - | - | - | - | - | - | - | 1,067 | - |
| 1b.1 | Subtotal Period 1b Activity Costs | 572 | - | - | - | - | - | 1,827 | 560 | 2,959 | 2,564 | - | 395 | - | - | - | - | - | - | 1,067 | 14,215 |
| Period 1b Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 1b.2.1 | Site Characterization | - | - | - | - | - | - | 1,505 | 451 | 1,956 | 1,956 | - | - | - | - | - | - | - | - | 8,988 | 3,563 |
| 1b.2.2 | Mixed/Hazardous Waste | - | - | 353 | 94 | 178 | - | - | 76 | 702 | 702 | - | - | 6,132 | - | - | - | - | 351,977 | 2,348 | - |
| 1b.2.3 | Asbestos Abatement | - | 2,526 | 3 | 150 | - | 1,369 | - | 996 | 5,044 | 5,044 | - | - | - | 12,843 | - | - | - | 166,959 | 20,907 | - |
| 1b.2 | Subtotal Period 1b Additional Costs | - | 2,526 | 356 | 244 | 178 | 1,369 | 1,505 | 1,524 | 7,702 | 7,702 | - | - | 6,132 | 12,843 | - | - | - | 518,936 | 32,243 | 3,563 |
| Period 1b Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 1b.3.1 | Decon equipment | 1,055 | - | - | - | - | - | - | 158 | 1,213 | 1,213 | - | - | - | - | - | - | - | - | - | - |
| 1b.3.2 | DOC staff relocation expenses | - | - | - | - | - | - | 1,264 | 190 | 1,454 | 1,454 | - | - | - | - | - | - | - | - | - | - |
| 1b.3.3 | Process decommissioning water waste | 25 | - | 16 | 29 | - | 66 | - | 35 | 172 | 172 | - | - | - | 152 | - | - | - | 9,127 | 30 | - |
| 1b.3.4 | Process decommissioning chemical flush waste | 2 | - | 61 | 199 | - | 3,889 | - | 1,009 | 5,159 | 5,159 | - | - | - | - | - | - | - | 62,689 | 110 | - |
| 1b.3.5 | Small tool allowance | - | 36 | - | - | - | - | - | 5 | 42 | 42 | - | - | - | - | - | - | - | - | - | - |
| 1b.3.6 | Pipe cutting equipment | - | 1,200 | - | - | - | - | - | 180 | 1,380 | 1,380 | - | - | - | - | - | - | - | - | - | - |
| 1b.3.7 | Decon rig | 2,104 | - | - | - | - | - | - | 316 | 2,419 | 2,419 | - | - | - | - | - | - | - | - | - | - |
| 1b.3.8 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 399 | 60 | 459 | - | 459 | - | - | - | - | - | - | - | - | - |
| 1b.3.9 | Retention and Severance | - | - | - | - | - | - | 4,017 | 603 | 4,620 | 4,620 | - | - | - | - | - | - | - | - | - | - |
| 1b.3.10 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 623 | - | 623 | - | 623 | - | - | - | - | - | - | - | - | - |
| 1b.3 | Subtotal Period 1b Collateral Costs | 3,185 | 1,236 | 77 | 228 | - | 3,955 | 6,303 | 2,555 | 17,540 | 16,458 | 1,082 | - | - | 152 | 588 | - | - | 71,815 | 140 | - |
| Period 1b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 1b.4.1 | Decon supplies | 38 | - | - | - | - | - | - | 9 | 47 | 47 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.2 | Insurance | - | - | - | - | - | - | 828 | 83 | 910 | 910 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.3 | Property taxes | - | - | - | - | - | - | 1,713 | 171 | 1,884 | 1,884 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.4 | Health physics supplies | - | 449 | - | - | - | - | - | 112 | 561 | 561 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.5 | Heavy equipment rental | - | 375 | - | - | - | - | - | 56 | 432 | 432 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.6 | Disposal of DAW generated | - | - | 6 | 3 | - | 27 | - | 8 | 43 | 43 | - | - | - | 324 | - | - | - | 6,473 | 11 | - |
| 1b.4.7 | Plant energy budget | - | - | - | - | - | - | 1,617 | 243 | 1,859 | 1,859 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.8 | NRC Fees | - | - | - | - | - | - | 196 | 20 | 216 | 216 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.9 | Emergency Planning Fees | - | - | - | - | - | - | 1,084 | 108 | 1,193 | - | 1,193 | - | - | - | - | - | - | - | - | - |
| 1b.4.10 | Fixed Overhead | - | - | - | - | - | - | 718 | 108 | 826 | 826 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.11 | Spent Fuel Pool O&M | - | - | - | - | - | - | 211 | 32 | 242 | - | 242 | - | - | - | - | - | - | - | - | - |
| 1b.4.12 | ISFSI Operating Costs | - | - | - | - | - | - | 28 | 4 | 32 | - | 32 | - | - | - | - | - | - | - | - | - |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table E-2
Prairie Island DECON Unit 2
DECON Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|--|---|--------------|--------------|-----------------|-----------------|---------------------------|---------------------|----------------|-------------------|----------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|---------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| Period 1b Period-Dependent Costs (continued) | | | | | | | | | | | | | | | | | | | | | | |
| 1b.4.13 | Railroad Track Maintenance | - | - | - | - | - | - | 31 | 5 | 36 | 36 | - | - | - | - | - | - | - | - | - | - | |
| 1b.4.14 | Security Staff Cost | - | - | - | - | - | - | 4,153 | 623 | 4,775 | 4,775 | - | - | - | - | - | - | - | - | - | 61,192 | |
| 1b.4.15 | DOC Staff Cost | - | - | - | - | - | - | 4,182 | 627 | 4,810 | 4,810 | - | - | - | - | - | - | - | - | - | 46,672 | |
| 1b.4.16 | Utility Staff Cost | - | - | - | - | - | - | 10,811 | 1,622 | 12,432 | 12,432 | - | - | - | - | - | - | - | - | - | 172,167 | |
| 1b.4 | Subtotal Period 1b Period-Dependent Costs | 38 | 825 | 6 | 3 | - | 27 | 25,571 | 3,830 | 30,299 | 28,832 | 1,467 | - | - | 324 | - | - | - | - | 6,473 | 11 | 280,031 |
| 1b.0 | TOTAL PERIOD 1b COST | 3,795 | 4,586 | 440 | 475 | 178 | 5,351 | 35,206 | 8,470 | 58,501 | 55,557 | 2,549 | 395 | 6,132 | 13,319 | 588 | - | - | 597,225 | 33,460 | 297,808 | |
| PERIOD 1 TOTALS | | 3,795 | 5,917 | 451 | 479 | 178 | 5,398 | 106,531 | 18,847 | 141,595 | 132,646 | 8,269 | 681 | 6,132 | 13,884 | 588 | - | - | 608,524 | 33,478 | 799,228 | |
| PERIOD 2a - Large Component Removal | | | | | | | | | | | | | | | | | | | | | | |
| Period 2a Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Nuclear Steam Supply System Removal | | | | | | | | | | | | | | | | | | | | | | |
| 2a.1.1.1 | Reactor Coolant Piping | 54 | 47 | 10 | 18 | - | 187 | - | 89 | 406 | 406 | - | - | - | 508 | - | - | - | 35,411 | 1,421 | - | |
| 2a.1.1.2 | Pressurizer Relief Tank | 24 | 21 | 6 | 12 | - | 125 | - | 51 | 238 | 238 | - | - | - | 338 | - | - | - | 23,594 | 630 | - | |
| 2a.1.1.3 | Reactor Coolant Pumps & Motors | 57 | 68 | 110 | 93 | - | 463 | - | 186 | 977 | 977 | - | - | - | 2,332 | - | - | - | 295,800 | 2,049 | 100 | |
| 2a.1.1.4 | Pressurizer | - | 77 | 503 | 97 | - | 776 | - | 278 | 1,732 | 1,732 | - | - | - | 2,196 | - | - | - | 185,015 | 1,666 | 938 | |
| 2a.1.1.5 | Steam Generators | - | 3,307 | 2,269 | 1,770 | 2,409 | 4,001 | - | 2,681 | 16,437 | 16,437 | - | - | 18,672 | 11,316 | - | - | - | 1,689,435 | 11,613 | 2,875 | |
| 2a.1.1.6 | CRDMs/ICIs/Service Structure Removal | 302 | 281 | 218 | 66 | - | 938 | - | 488 | 2,294 | 2,294 | - | - | - | 4,797 | - | - | - | 177,400 | 8,104 | - | |
| 2a.1.1.7 | Reactor Vessel Internals | 82 | 4,861 | 13,621 | 929 | - | 9,015 | 307 | 11,878 | 40,693 | 40,693 | - | - | - | 501 | 125 | 673 | - | 164,987 | 25,123 | 1,163 | |
| 2a.1.1.8 | Reactor Vessel | 94 | 6,046 | 2,028 | 728 | - | 2,975 | 307 | 6,804 | 18,982 | 18,982 | - | - | - | 8,073 | - | - | - | 576,524 | 25,123 | 1,163 | |
| 2a.1.1 | Totals | 613 | 14,709 | 18,764 | 3,714 | 2,409 | 18,480 | 614 | 22,455 | 81,759 | 81,759 | - | - | 18,672 | 30,062 | 125 | 673 | - | 3,148,166 | 75,729 | 6,240 | |
| Removal of Major Equipment | | | | | | | | | | | | | | | | | | | | | | |
| 2a.1.2 | Main Turbine/Generator | - | 331 | 172 | 64 | 527 | 377 | - | 283 | 1,752 | 1,752 | - | - | 2,131 | 1,187 | - | - | - | 203,265 | 4,667 | - | |
| 2a.1.3 | Main Condensers | - | 2,801 | 109 | 62 | 705 | 533 | - | 960 | 5,170 | 5,170 | - | - | 3,800 | 1,587 | - | - | - | 271,824 | 39,151 | - | |
| Cascading Costs from Clean Building Demolition | | | | | | | | | | | | | | | | | | | | | | |
| 2a.1.4.1 | Reactor | - | 794 | - | - | - | - | - | 119 | 913 | 913 | - | - | - | - | - | - | - | - | 7,589 | - | |
| 2a.1.4.2 | Auxiliary | - | 221 | - | - | - | - | - | 33 | 254 | 254 | - | - | - | - | - | - | - | - | 1,309 | - | |
| 2a.1.4.3 | Radwaste | - | 9 | - | - | - | - | - | 1 | 10 | 10 | - | - | - | - | - | - | - | - | 65 | - | |
| 2a.1.4 | Totals | - | 1,023 | - | - | - | - | - | 154 | 1,177 | 1,177 | - | - | - | - | - | - | - | - | 8,963 | - | |
| Disposal of Plant Systems | | | | | | | | | | | | | | | | | | | | | | |
| 2a.1.5.1 | Admin Bldg Ventilation | - | 6 | - | - | - | - | - | 1 | 7 | - | - | 7 | - | - | - | - | - | - | 90 | - | |
| 2a.1.5.2 | Air Removal | - | 29 | - | - | - | - | - | 4 | 33 | - | - | 33 | - | - | - | - | - | - | 422 | - | |
| 2a.1.5.3 | Auxiliary Feedwater | - | 46 | - | - | - | - | - | 7 | 53 | - | - | 53 | - | - | - | - | - | - | 676 | - | |
| 2a.1.5.4 | Auxiliary Feedwater - RCA | - | 38 | 0 | 1 | 30 | - | - | 14 | 84 | 84 | - | - | 178 | - | - | - | - | 7,214 | 486 | - | |
| 2a.1.5.5 | Bleed Steam | - | 90 | - | - | - | - | - | 13 | 103 | - | - | 103 | - | - | - | - | - | - | 1,331 | - | |
| 2a.1.5.6 | Caustic Addition - RCA | - | 40 | 0 | 2 | 40 | - | - | 16 | 99 | 99 | - | - | 240 | - | - | - | - | 9,761 | 468 | - | |
| 2a.1.5.7 | Chemical Feed | - | 17 | - | - | - | - | - | 3 | 20 | - | - | 20 | - | - | - | - | - | - | 261 | - | |
| 2a.1.5.8 | Chemical Feed - RCA | - | 3 | 0 | 0 | 3 | - | - | 1 | 7 | 7 | - | - | 16 | - | - | - | - | 634 | 31 | - | |
| 2a.1.5.9 | Circulating Water | - | 27 | - | - | - | - | - | 4 | 32 | - | - | 32 | - | - | - | - | - | - | 401 | - | |
| 2a.1.5.10 | Condensate | - | 525 | - | - | - | - | - | 79 | 603 | - | - | 603 | - | - | - | - | - | - | 7,537 | - | |
| 2a.1.5.11 | Condensate Polishing | - | 208 | - | - | - | - | - | 31 | 239 | - | - | 239 | - | - | - | - | - | - | 2,987 | - | |
| 2a.1.5.12 | Condensate Polishing - RCA | - | 38 | 1 | 4 | 81 | - | - | 22 | 145 | 145 | - | - | 483 | - | - | - | - | 19,616 | 493 | - | |
| 2a.1.5.13 | Electro-Hydraulic | - | 10 | - | - | - | - | - | 1 | 11 | - | - | 11 | - | - | - | - | - | - | 143 | - | |
| 2a.1.5.14 | External Circulating Water | - | 26 | - | - | - | - | - | 4 | 30 | - | - | 30 | - | - | - | - | - | - | 385 | - | |
| 2a.1.5.15 | External Circulating Water - RCA | - | 72 | 1 | 5 | 121 | - | - | 37 | 237 | 237 | - | - | 721 | - | - | - | - | 29,284 | 938 | - | |
| 2a.1.5.16 | Feedwater | - | 127 | - | - | - | - | - | 19 | 146 | - | - | 146 | - | - | - | - | - | - | 1,840 | - | |
| 2a.1.5.17 | Feedwater - RCA | - | 248 | 8 | 31 | 694 | - | - | 171 | 1,152 | 1,152 | - | - | 4,147 | - | - | - | - | 168,414 | 3,377 | - | |
| 2a.1.5.18 | Gland Seal | - | 34 | - | - | - | - | - | 5 | 39 | - | - | 39 | - | - | - | - | - | - | 504 | - | |
| 2a.1.5.19 | Heater Drain | - | 384 | - | - | - | - | - | 58 | 441 | - | - | 441 | - | - | - | - | - | - | 5,638 | - | |
| 2a.1.5.20 | Hypobromous Acid Feed | - | 6 | - | - | - | - | - | 1 | 7 | - | - | 7 | - | - | - | - | - | - | 86 | - | |
| 2a.1.5.21 | Hypobromous Acid Feed - RCA | - | 1 | 0 | 0 | 0 | - | - | 0 | 2 | 2 | - | - | 2 | - | - | - | - | 100 | 12 | - | |
| 2a.1.5.22 | Internal Circ Water & CDSR | - | 25 | - | - | - | - | - | 4 | 29 | - | - | 29 | - | - | - | - | - | - | 366 | - | |
| 2a.1.5.23 | Main Gen/Exciter/Transformer | - | 0 | - | - | - | - | - | 0 | 0 | - | - | 0 | - | - | - | - | - | - | 5 | - | |
| 2a.1.5.24 | Main Steam | - | 101 | - | - | - | - | - | 15 | 116 | - | - | 116 | - | - | - | - | - | - | 1,482 | - | |
| 2a.1.5.25 | Main Steam - RCA | - | 380 | 11 | 38 | 864 | - | - | 231 | 1,525 | 1,525 | - | - | 5,166 | - | - | - | - | 209,799 | 5,146 | - | |
| 2a.1.5.26 | Repairable Spare Snubbers | - | 6 | 0 | 0 | 2 | - | - | 2 | 10 | 10 | - | - | 12 | - | - | - | - | 490 | 82 | - | |
| 2a.1.5.27 | Steam Exclusion | - | 2 | - | - | - | - | - | 0 | 2 | - | - | 2 | - | - | - | - | - | - | 32 | - | |
| 2a.1.5.28 | Steam Exclusion - RCA | - | 4 | 0 | 0 | 4 | - | - | 2 | 10 | 10 | - | - | 24 | - | - | - | - | 966 | 47 | - | |
| 2a.1.5.29 | Steam Generator Blowdown | - | 416 | 21 | 27 | 319 | 215 | - | 212 | 1,210 | 1,210 | - | - | 1,906 | 631 | - | - | - | 118,130 | 5,778 | - | |
| 2a.1.5.30 | Steam Generators | - | 5 | - | - | - | - | - | 1 | 6 | - | - | 6 | - | - | - | - | - | - | 75 | - | |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table E-2
Prairie Island DECON Unit 2
DECON Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | | |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|---------|---------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | | |
| Disposal of Plant Systems (continued) | | | | | | | | | | | | | | | | | | | | | | | |
| 2a.1.5.31 | Turbine & Moisture Separators | - | 377 | - | - | - | - | - | 57 | 434 | - | - | 434 | - | - | - | - | - | - | - | 5,472 | - | |
| 2a.1.5.32 | Turbine Oil Purification | - | 53 | - | - | - | - | - | 8 | 61 | - | - | 61 | - | - | - | - | - | - | - | 757 | - | |
| 2a.1.5.33 | Water Treatment | - | 453 | - | - | - | - | - | 68 | 521 | - | - | 521 | - | - | - | - | - | - | - | 6,677 | - | |
| 2a.1.5.34 | Water Treatment - RCA | - | 20 | 0 | 1 | 19 | - | - | 8 | 49 | 49 | - | - | 115 | - | - | - | - | - | - | 4,652 | 252 | |
| 2a.1.5 | Totals | - | 3,817 | 43 | 108 | 2,177 | 215 | - | 1,100 | 7,461 | 4,528 | - | 2,933 | 13,010 | 631 | - | - | - | - | - | 569,060 | 54,280 | |
| 2a.1.6 | Scaffolding in support of decommissioning | - | 3,020 | 22 | 10 | 188 | 30 | - | 794 | 4,064 | 4,064 | - | - | 1,012 | 89 | - | - | - | - | - | 51,216 | 26,270 | |
| 2a.1 | Subtotal Period 2a Activity Costs | 613 | 25,702 | 19,110 | 3,959 | 6,005 | 19,635 | 614 | 25,745 | 101,384 | 98,450 | - | 2,933 | 38,625 | 33,556 | 125 | 673 | - | - | - | 4,243,531 | 209,060 | 6,240 |
| Period 2a Additional Costs | | | | | | | | | | | | | | | | | | | | | | | |
| 2a.2.1 | Retired RPV upper internals package | - | 257 | 387 | 217 | - | 1,394 | - | 1,041 | 3,296 | 3,296 | - | - | - | 376 | 112 | - | - | - | - | 50,164 | 3,333 | 133 |
| 2a.2 | Subtotal Period 2a Additional Costs | - | 257 | 387 | 217 | - | 1,394 | - | 1,041 | 3,296 | 3,296 | - | - | - | 376 | 112 | - | - | - | - | 50,164 | 3,333 | 133 |
| Period 2a Collateral Costs | | | | | | | | | | | | | | | | | | | | | | | |
| 2a.3.1 | Process decommissioning water waste | 49 | - | 33 | 60 | - | 134 | - | 70 | 347 | 347 | - | - | - | 308 | - | - | - | - | - | 18,487 | 60 | - |
| 2a.3.3 | Small tool allowance | - | 269 | - | - | - | - | - | 40 | 309 | 278 | - | 31 | - | - | - | - | - | - | - | - | - | - |
| 2a.3.4 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 13,363 | 2,004 | 15,368 | - | 15,368 | - | - | - | - | - | - | - | - | - | - | - |
| 2a.3.5 | Retention and Severance | - | - | - | - | - | - | 8,215 | 1,232 | 9,447 | 9,447 | - | - | - | - | - | - | - | - | - | - | - | - |
| 2a.3.6 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 1,780 | - | 1,780 | - | 1,780 | - | - | - | - | - | - | - | - | - | - | - |
| 2a.3 | Subtotal Period 2a Collateral Costs | 49 | 269 | 33 | 60 | - | 134 | 23,358 | 3,347 | 27,250 | 10,072 | 17,147 | 31 | - | 308 | - | - | - | - | - | 18,487 | 60 | - |
| Period 2a Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | | |
| 2a.4.1 | Decon supplies | 107 | - | - | - | - | - | - | 27 | 134 | 134 | - | - | - | - | - | - | - | - | - | - | - | - |
| 2a.4.2 | Insurance | - | - | - | - | - | - | 690 | 69 | 759 | 759 | - | - | - | - | - | - | - | - | - | - | - | - |
| 2a.4.3 | Property taxes | - | - | - | - | - | - | 4,548 | 455 | 5,002 | 5,002 | - | - | - | - | - | - | - | - | - | - | - | - |
| 2a.4.4 | Health physics supplies | - | 2,103 | - | - | - | - | - | 526 | 2,629 | 2,629 | - | - | - | - | - | - | - | - | - | - | - | - |
| 2a.4.5 | Heavy equipment rental | - | 3,565 | - | - | - | - | - | 535 | 4,100 | 4,100 | - | - | - | - | - | - | - | - | - | - | - | - |
| 2a.4.6 | Disposal of DAW generated | - | - | 86 | 35 | - | 358 | - | 103 | 582 | 582 | - | - | 4,345 | - | - | - | - | - | - | 86,891 | 142 | - |
| 2a.4.7 | Plant energy budget | - | - | - | - | - | - | 2,194 | 329 | 2,523 | 2,523 | - | - | - | - | - | - | - | - | - | - | - | - |
| 2a.4.8 | NRC Fees | - | - | - | - | - | - | 526 | 53 | 578 | 578 | - | - | - | - | - | - | - | - | - | - | - | - |
| 2a.4.9 | Emergency Planning Fees | - | - | - | - | - | - | 2,647 | 265 | 2,912 | - | 2,912 | - | - | - | - | - | - | - | - | - | - | - |
| 2a.4.10 | Fixed Overhead | - | - | - | - | - | - | 1,695 | 254 | 1,949 | 1,949 | - | - | - | - | - | - | - | - | - | - | - | - |
| 2a.4.11 | Spent Fuel Pool O&M | - | - | - | - | - | - | 602 | 90 | 692 | - | 692 | - | - | - | - | - | - | - | - | - | - | - |
| 2a.4.12 | ISFSI Operating Costs | - | - | - | - | - | - | 80 | 12 | 92 | - | 92 | - | - | - | - | - | - | - | - | - | - | - |
| 2a.4.13 | Railroad Track Maintenance | - | - | - | - | - | - | 318 | 48 | 366 | 366 | - | - | - | - | - | - | - | - | - | - | - | - |
| 2a.4.14 | Remedial Actions Surveys | - | - | - | - | - | - | 1,596 | 239 | 1,835 | 1,835 | - | - | - | - | - | - | - | - | - | - | - | - |
| 2a.4.15 | Security Staff Cost | - | - | - | - | - | - | 10,900 | 1,635 | 12,534 | 12,534 | - | - | - | - | - | - | - | - | - | - | - | 160,018 |
| 2a.4.16 | DOC Staff Cost | - | - | - | - | - | - | 20,663 | 3,099 | 23,763 | 23,763 | - | - | - | - | - | - | - | - | - | - | - | 225,210 |
| 2a.4.17 | Utility Staff Cost | - | - | - | - | - | - | 27,056 | 4,058 | 31,115 | 31,115 | - | - | - | - | - | - | - | - | - | - | - | 419,049 |
| 2a.4 | Subtotal Period 2a Period-Dependent Costs | 107 | 5,668 | 86 | 35 | - | 358 | 73,514 | 11,797 | 91,565 | 87,870 | 3,696 | - | - | 4,345 | - | - | - | - | - | 86,891 | 142 | 804,276 |
| 2a.0 | TOTAL PERIOD 2a COST | 770 | 31,895 | 19,616 | 4,270 | 6,005 | 21,522 | 97,486 | 41,931 | 223,495 | 199,687 | 20,843 | 2,964 | 38,625 | 38,584 | 237 | 673 | - | - | - | 4,399,073 | 212,595 | 810,649 |
| PERIOD 2b - Site Decontamination | | | | | | | | | | | | | | | | | | | | | | | |
| Period 2b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | | |
| Disposal of Plant Systems | | | | | | | | | | | | | | | | | | | | | | | |
| 2b.1.1.1 | ADT & Misc Ventilation | - | 25 | 1 | 1 | 26 | 3 | - | 11 | 66 | 66 | - | - | 153 | 9 | - | - | - | - | - | 6,803 | 363 | - |
| 2b.1.1.2 | Aux Bldg Normal Ventilation | - | 69 | 2 | 6 | 116 | 13 | - | 39 | 246 | 246 | - | - | 692 | 39 | - | - | - | - | - | 30,595 | 1,013 | - |
| 2b.1.1.3 | Aux Bldg Special Ventilation | - | 14 | 0 | 1 | 12 | 2 | - | 6 | 34 | 34 | - | - | 70 | 6 | - | - | - | - | - | 3,234 | 197 | - |
| 2b.1.1.4 | Battery Rm Special Ventilation | - | 2 | - | - | - | - | - | 0 | 2 | - | - | 2 | - | - | - | - | - | - | - | - | 24 | - |
| 2b.1.1.5 | Boron Recycle | 0 | 4 | 0 | 0 | 0 | 3 | - | 2 | 10 | 10 | - | - | 3 | 9 | - | - | - | - | - | 700 | 50 | - |
| 2b.1.1.6 | Chemical & Volume Control | 749 | 942 | 62 | 57 | 394 | 677 | - | 853 | 3,736 | 3,736 | - | - | 2,356 | 1,977 | - | - | - | - | - | 223,753 | 23,197 | - |
| 2b.1.1.7 | Cold Chemical Lab Ventilation | - | 1 | - | - | - | - | - | 0 | 1 | - | - | 1 | - | - | - | - | - | - | - | - | 9 | - |
| 2b.1.1.8 | Component Cooling - RCA | - | 647 | 25 | 88 | 2,007 | - | - | 479 | 3,246 | 3,246 | - | - | 11,996 | - | - | - | - | - | - | 487,169 | 8,583 | - |
| 2b.1.1.9 | Containment Cooling | - | 35 | - | - | - | - | - | 5 | 40 | - | - | 40 | - | - | - | - | - | - | - | - | 502 | - |
| 2b.1.1.10 | Containment Cooling - RCA | - | 302 | 6 | 20 | 459 | - | - | 148 | 934 | 934 | - | - | 2,743 | - | - | - | - | - | - | 111,390 | 3,949 | - |
| 2b.1.1.11 | Containment Hydrogen Control - RCA | - | 36 | 0 | 1 | 24 | - | - | 13 | 74 | 74 | - | - | 141 | - | - | - | - | - | - | 5,742 | 494 | - |
| 2b.1.1.12 | Containment Spray - RCA | - | 194 | 3 | 11 | 243 | - | - | 87 | 538 | 538 | - | - | 1,453 | - | - | - | - | - | - | 59,019 | 2,617 | - |
| 2b.1.1.13 | Containment Ventilation | - | 235 | 23 | 49 | 790 | 243 | - | 248 | 1,587 | 1,587 | - | - | 4,721 | 722 | - | - | - | - | - | 237,643 | 3,375 | - |
| 2b.1.1.14 | Control/Relay/Cmpt Rm Vent | - | 31 | 1 | 2 | 44 | 7 | - | 17 | 102 | 102 | - | - | 260 | 20 | - | - | - | - | - | 11,878 | 454 | - |
| 2b.1.1.15 | Cooling Water | - | 159 | - | - | - | - | - | 24 | 183 | - | - | 183 | - | - | - | - | - | - | - | - | 2,344 | - |
| 2b.1.1.16 | Cooling Water - RCA | - | 476 | 17 | 62 | 1,412 | - | - | 342 | 2,310 | 2,310 | - | - | 8,442 | - | - | - | - | - | - | 342,822 | 6,311 | - |
| 2b.1.1.17 | Cranes/Hoists/Elevators - RCA | - | 3 | 0 | 1 | 17 | - | - | 4 | 25 | 25 | - | - | 103 | - | - | - | - | - | - | 4,184 | 48 | - |
| 2b.1.1.18 | D3 Emergency Diesel | - | 10 | - | - | - | - | - | 2 | 12 | - | - | 12 | - | - | - | - | - | - | - | - | 141 | - |
| 2b.1.1.19 | D4 Emergency Diesel | - | 10 | - | - | - | - | - | 2 | 12 | - | - | 12 | - | - | - | - | - | - | - | - | 141 | - |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table E-2
Prairie Island DECON Unit 2
DECON Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|---------------------------------------|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|-------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| Disposal of Plant Systems (continued) | | | | | | | | | | | | | | | | | | | | | | |
| 2b.1.1.20 | D5 Emergency Diesel | - | 0 | - | - | - | - | - | 0 | 0 | - | - | 0 | - | - | - | - | - | - | - | 5 | - |
| 2b.1.1.21 | Electrical - Clean | - | 1,714 | - | - | - | - | - | 257 | 1,972 | - | - | 1,972 | - | - | - | - | - | - | - | 24,276 | - |
| 2b.1.1.22 | Electrical - Contaminated | - | 475 | 5 | 16 | 334 | 25 | - | 178 | 1,034 | 1,034 | - | - | 1,997 | 75 | - | - | - | - | 85,887 | 6,503 | - |
| 2b.1.1.23 | Electrical - Decontaminated | - | 2,955 | 38 | 138 | 3,138 | - | - | 1,234 | 7,503 | 7,503 | - | - | 18,753 | - | - | - | - | - | 761,569 | 38,423 | - |
| 2b.1.1.24 | Filter Rm Ventilation | - | 5 | 0 | 0 | 4 | 0 | - | 2 | 11 | 11 | - | - | 24 | 1 | - | - | - | - | 1,017 | 69 | - |
| 2b.1.1.25 | Fire Protection & Detection | - | 204 | - | - | - | - | - | 31 | 235 | - | - | 235 | - | - | - | - | - | - | - | 3,009 | - |
| 2b.1.1.26 | Fire Protection & Detection - RCA | - | 246 | 4 | 13 | 306 | - | - | 110 | 679 | 679 | - | - | 1,828 | - | - | - | - | - | 74,245 | 3,134 | - |
| 2b.1.1.27 | Fuel Handling | - | 74 | 1 | 2 | 34 | 17 | - | 28 | 156 | 156 | - | - | 200 | 49 | - | - | - | - | 11,273 | 1,101 | - |
| 2b.1.1.28 | Fuel Oil | - | 1 | - | - | - | - | - | 0 | 1 | - | - | 1 | - | - | - | - | - | - | - | 9 | - |
| 2b.1.1.29 | HVAC - Clean | - | 151 | - | - | - | - | - | 23 | 174 | - | - | 174 | - | - | - | - | - | - | - | 2,373 | - |
| 2b.1.1.30 | HVAC - Contaminated | - | 1,231 | 29 | 87 | 1,798 | 136 | - | 627 | 3,908 | 3,908 | - | - | 10,745 | 405 | - | - | - | - | 462,103 | 16,579 | - |
| 2b.1.1.31 | Heating | - | 322 | - | - | - | - | - | 48 | 370 | - | - | 370 | - | - | - | - | - | - | - | 4,804 | - |
| 2b.1.1.32 | Heating - RCA | - | 337 | 4 | 14 | 319 | - | - | 135 | 809 | 809 | - | - | 1,907 | - | - | - | - | - | 77,458 | 4,086 | - |
| 2b.1.1.33 | Hot Lab & Sample Rm Ventilation | - | 20 | 0 | 1 | 18 | 1 | - | 8 | 48 | 48 | - | - | 107 | 4 | - | - | - | - | 4,622 | 285 | - |
| 2b.1.1.34 | Incore Instrumentation | 0 | 30 | 1 | 2 | 10 | 20 | - | 14 | 77 | 77 | - | - | 60 | 58 | - | - | - | - | 6,143 | 458 | - |
| 2b.1.1.35 | Misc Drains & Vents | - | 234 | 12 | 12 | 77 | 145 | - | 109 | 590 | 590 | - | - | 458 | 426 | - | - | - | - | 46,079 | 3,180 | - |
| 2b.1.1.36 | Misc Lab & Service Areas Vent | - | 129 | 8 | 8 | 62 | 84 | - | 65 | 356 | 356 | - | - | 370 | 244 | - | - | - | - | 30,899 | 1,713 | - |
| 2b.1.1.37 | Miscellaneous Gas | - | 72 | - | - | - | - | - | 11 | 83 | - | - | 83 | - | - | - | - | - | - | - | 1,073 | - |
| 2b.1.1.38 | Miscellaneous Gas - RCA | - | 134 | 1 | 4 | 100 | - | - | 49 | 289 | 289 | - | - | 600 | - | - | - | - | - | 24,378 | 1,636 | - |
| 2b.1.1.39 | Radiation Monitoring | - | 7 | - | - | - | - | - | 1 | 9 | - | - | 9 | - | - | - | - | - | - | - | 111 | - |
| 2b.1.1.40 | Radiation Monitoring - RCA | - | 65 | 1 | 2 | 53 | - | - | 25 | 145 | 145 | - | - | 316 | - | - | - | - | - | 12,826 | 782 | - |
| 2b.1.1.41 | Reactor Coolant | 163 | 236 | 20 | 16 | 38 | 249 | - | 213 | 937 | 937 | - | - | 229 | 730 | - | - | - | - | 56,440 | 5,517 | - |
| 2b.1.1.42 | Reactor Hot Sampling | 140 | 126 | 11 | 7 | 9 | 108 | - | 132 | 533 | 533 | - | - | 54 | 312 | - | - | - | - | 22,678 | 3,686 | - |
| 2b.1.1.43 | Reactor Makeup | - | 41 | - | - | - | - | - | 6 | 47 | - | - | 47 | - | - | - | - | - | - | - | 583 | - |
| 2b.1.1.44 | Reactor Makeup - RCA | - | 4 | 0 | 0 | 5 | - | - | 2 | 11 | 11 | - | - | 28 | - | - | - | - | - | 1,148 | 47 | - |
| 2b.1.1.45 | Reactor Vessel | 9 | 18 | 1 | 0 | 4 | 5 | - | 11 | 47 | 47 | - | - | 22 | 14 | - | - | - | - | 1,816 | 385 | - |
| 2b.1.1.46 | Residual Heat Removal | 348 | 393 | 84 | 86 | 477 | 1,102 | - | 641 | 3,132 | 3,132 | - | - | 2,853 | 3,244 | - | - | - | - | 324,232 | 7,112 | - |
| 2b.1.1.47 | Safeguards Chilled Water | - | 5 | - | - | - | - | - | 1 | 6 | - | - | 6 | - | - | - | - | - | - | - | 75 | - |
| 2b.1.1.48 | Safety Injection | - | 874 | 42 | 72 | 1,117 | 395 | - | 500 | 3,000 | 3,000 | - | - | 6,676 | 1,161 | - | - | - | - | 345,708 | 12,284 | - |
| 2b.1.1.49 | Sampling | - | 52 | 3 | 2 | 6 | 32 | - | 23 | 119 | 119 | - | - | 37 | 93 | - | - | - | - | 7,628 | 714 | - |
| 2b.1.1.50 | Service Bldg & New Cmpt Vent | - | 0 | - | - | - | - | - | 0 | 0 | - | - | 0 | - | - | - | - | - | - | - | 6 | - |
| 2b.1.1.51 | Shield Bldg Ventilation | - | 120 | 13 | 25 | 339 | 163 | - | 127 | 787 | 787 | - | - | 2,028 | 484 | - | - | - | - | 113,139 | 1,743 | - |
| 2b.1.1.52 | Station & Instrument Air | - | 161 | - | - | - | - | - | 24 | 185 | - | - | 185 | - | - | - | - | - | - | - | 2,424 | - |
| 2b.1.1.53 | Station & Instrument Air - RCA | - | 299 | 3 | 12 | 272 | - | - | 118 | 704 | 704 | - | - | 1,625 | - | - | - | - | - | 65,986 | 3,638 | - |
| 2b.1.1.54 | Turbine Bldg Traps & Drains | - | 30 | - | - | - | - | - | 5 | 35 | - | - | 35 | - | - | - | - | - | - | - | 462 | - |
| 2b.1.1.55 | Turbine Bldg Traps & Drains - RCA | - | 30 | 0 | 1 | 30 | - | - | 12 | 73 | 73 | - | - | 180 | - | - | - | - | - | 7,321 | 344 | - |
| 2b.1.1.56 | Turbine Bldg Ventilation | - | 46 | - | - | - | - | - | 7 | 53 | - | - | 53 | - | - | - | - | - | - | - | 655 | - |
| 2b.1.1.57 | Unit Coolers | - | 23 | - | - | - | - | - | 3 | 26 | - | - | 26 | - | - | - | - | - | - | - | 332 | - |
| 2b.1.1.58 | Unit Coolers - RCA | - | 56 | 0 | 2 | 39 | - | - | 20 | 117 | 117 | - | - | 232 | - | - | - | - | - | 9,413 | 690 | - |
| 2b.1.1.59 | Waste Gas Disposal | 553 | 479 | 43 | 45 | 410 | 464 | - | 585 | 2,581 | 2,581 | - | - | 2,453 | 1,358 | - | - | - | - | 187,339 | 14,308 | - |
| 2b.1.1.60 | Waste Liquid Disposal | 1,436 | 1,800 | 116 | 100 | 612 | 1,234 | - | 1,595 | 6,893 | 6,893 | - | - | 3,655 | 3,594 | - | - | - | - | 381,754 | 44,485 | - |
| 2b.1.1.61 | Waste Solid Disposal | 115 | 145 | 12 | 11 | 65 | 134 | - | 140 | 622 | 622 | - | - | 389 | 393 | - | - | - | - | 41,177 | 3,481 | - |
| 2b.1.1 | Totals | 3,515 | 16,542 | 596 | 980 | 15,220 | 5,264 | - | 9,399 | 51,516 | 48,072 | - | 3,444 | 90,963 | 15,429 | - | - | - | - | 4,689,210 | 270,390 | - |
| 2b.1.2 | Scaffolding in support of decommissioning | - | 3,775 | 27 | 13 | 235 | 37 | - | 993 | 5,081 | 5,081 | - | - | 1,265 | 112 | - | - | - | - | 64,020 | 32,837 | - |
| Decontamination of Site Buildings | | | | | | | | | | | | | | | | | | | | | | |
| 2b.1.3.1 | Reactor | 1,215 | 2,808 | 240 | 1,236 | 373 | 13,625 | - | 4,981 | 24,479 | 24,479 | - | - | 2,230 | 83,434 | - | - | - | - | 3,633,771 | 50,962 | - |
| 2b.1.3.2 | Auxiliary | 1,292 | 422 | 23 | 117 | 177 | 648 | - | 960 | 3,639 | 3,639 | - | - | 1,060 | 6,118 | - | - | - | - | 332,495 | 23,821 | - |
| 2b.1.3.3 | Backwash Waste Receiving Tank | - | 28 | 3 | 17 | - | 97 | - | 34 | 179 | 179 | - | - | - | 929 | - | - | - | - | 43,896 | 301 | - |
| 2b.1.3.4 | Drum Transfer & Truck Loading Enclosure | 18 | 9 | 1 | 3 | 3 | 14 | - | 16 | 63 | 63 | - | - | 19 | 135 | - | - | - | - | 7,118 | 369 | - |
| 2b.1.3.5 | LLRW Storage Enclosure | 123 | 54 | 3 | 17 | 6 | 96 | - | 103 | 403 | 403 | - | - | 38 | 920 | - | - | - | - | 44,971 | 2,426 | - |
| 2b.1.3.6 | Radwaste | 55 | 24 | 1 | 8 | 7 | 43 | - | 47 | 185 | 185 | - | - | 42 | 412 | - | - | - | - | 21,136 | 1,083 | - |
| 2b.1.3.7 | Resin Disposal | 16 | 12 | 1 | 3 | 14 | 14 | - | 17 | 76 | 76 | - | - | 83 | 124 | - | - | - | - | 9,271 | 383 | - |
| 2b.1.3 | Totals | 2,720 | 3,357 | 271 | 1,400 | 581 | 14,537 | - | 6,158 | 29,024 | 29,024 | - | - | 3,471 | 92,071 | - | - | - | - | 4,092,658 | 79,343 | - |
| 2b.1.4 | Prepare/submit License Termination Plan | - | - | - | - | - | - | 225 | 34 | 259 | 259 | - | - | - | - | - | - | - | - | - | - | 1,751 |
| 2b.1.5 | Receive NRC approval of termination plan | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - | - |
| 2b.1 | Subtotal Period 2b Activity Costs | 6,235 | 23,674 | 895 | 2,393 | 16,035 | 19,839 | 225 | 16,584 | 85,879 | 82,435 | - | 3,444 | 95,700 | 107,611 | - | - | - | - | 8,845,887 | 382,570 | 1,751 |
| Period 2b Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 2b.2.1 | Operational Equipment | - | - | 11 | 36 | 606 | - | - | 97 | 751 | 751 | - | - | 5,880 | - | - | - | - | - | 147,000 | 16 | - |
| 2b.2.2 | Excavation of Underground Services | - | 1,175 | - | - | - | - | 225 | 328 | 1,728 | 1,728 | - | - | - | - | - | - | - | - | - | 7,411 | - |
| 2b.2.3 | Security Modifications | - | - | - | - | - | - | 4,348 | 652 | 5,000 | 5,000 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.2 | Subtotal Period 2b Additional Costs | - | 1,175 | 11 | 36 | 606 | - | 4,573 | 1,077 | 7,478 | 7,478 | - | - | 5,880 | - | - | - | - | - | 147,000 | 7,427 | - |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table E-2
Prairie Island DECON Unit 2
DECON Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| Period 2b Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 2b.3.1 | Process decommissioning water waste | 166 | - | 113 | 203 | - | 456 | - | 239 | 1,176 | 1,176 | - | - | - | 1,047 | - | - | - | 62,844 | 204 | - |
| 2b.3.2 | Process decommissioning chemical flush waste | 3 | - | 119 | 390 | - | 893 | - | 295 | 1,699 | 1,699 | - | - | - | 1,154 | - | - | - | 122,948 | 216 | - |
| 2b.3.3 | Small tool allowance | - | 446 | - | - | - | - | - | 67 | 513 | 513 | - | - | - | - | - | - | - | - | - | - |
| 2b.3.4 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 51,308 | 7,696 | 59,005 | - | 59,005 | - | - | - | - | - | - | - | - | - |
| 2b.3.5 | Retention and Severance | - | - | - | - | - | - | 2,839 | 426 | 3,265 | 3,265 | - | - | - | - | - | - | - | - | - | - |
| 2b.3.6 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 1,348 | - | 1,348 | - | 1,348 | - | - | - | - | - | - | - | - | - |
| 2b.3.7 | On-site survey and release of 0.437 tons clean metallic waste | - | - | - | - | - | - | 1 | 0 | 1 | 1 | - | - | - | - | - | - | - | - | - | - |
| 2b.3 | Subtotal Period 2b Collateral Costs | 169 | 446 | 232 | 592 | - | 1,349 | 55,497 | 8,723 | 67,007 | 6,654 | 60,353 | - | - | 2,201 | - | - | - | 185,792 | 420 | - |
| Period 2b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 2b.4.1 | Decon supplies | 1,219 | - | - | - | - | - | - | 305 | 1,524 | 1,524 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.2 | Insurance | - | - | - | - | - | - | 523 | 52 | 575 | 575 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.3 | Property taxes | - | - | - | - | - | - | 3,075 | 308 | 3,383 | 3,383 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.4 | Health physics supplies | - | 2,866 | - | - | - | - | - | 716 | 3,582 | 3,582 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.5 | Heavy equipment rental | - | 2,774 | - | - | - | - | - | 416 | 3,190 | 3,190 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.6 | Disposal of DAW generated | - | - | 103 | 42 | - | 429 | - | 124 | 698 | 698 | - | - | - | 5,209 | - | - | - | 104,172 | 170 | - |
| 2b.4.7 | Plant energy budget | - | - | - | - | - | - | 1,313 | 197 | 1,509 | 1,509 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.8 | NRC Fees | - | - | - | - | - | - | 398 | 40 | 438 | 438 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.9 | Emergency Planning Fees | - | - | - | - | - | - | 2,006 | 201 | 2,207 | - | 2,207 | - | - | - | - | - | - | - | - | - |
| 2b.4.10 | Fixed Overhead | - | - | - | - | - | - | 1,284 | 193 | 1,477 | 1,477 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.11 | Spent Fuel Pool O&M | - | - | - | - | - | - | 456 | 68 | 524 | - | 524 | - | - | - | - | - | - | - | - | - |
| 2b.4.12 | Liquid Radwaste Processing Equipment/Services | - | - | - | - | - | - | 229 | 34 | 264 | 264 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.13 | ISFSI Operating Costs | - | - | - | - | - | - | 60 | 9 | 69 | - | 69 | - | - | - | - | - | - | - | - | - |
| 2b.4.14 | Railroad Track Maintenance | - | - | - | - | - | - | 67 | 10 | 78 | 78 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.15 | Remedial Actions Surveys | - | - | - | - | - | - | 1,209 | 181 | 1,391 | 1,391 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.16 | Security Staff Cost | - | - | - | - | - | - | 8,259 | 1,239 | 9,497 | 9,497 | - | - | - | - | - | - | - | - | - | 121,244 |
| 2b.4.17 | DOC Staff Cost | - | - | - | - | - | - | 15,117 | 2,268 | 17,385 | 17,385 | - | - | - | - | - | - | - | - | - | 163,904 |
| 2b.4.18 | Utility Staff Cost | - | - | - | - | - | - | 19,642 | 2,946 | 22,588 | 22,588 | - | - | - | - | - | - | - | - | - | 304,233 |
| 2b.4 | Subtotal Period 2b Period-Dependent Costs | 1,219 | 5,640 | 103 | 42 | - | 429 | 53,639 | 9,307 | 70,380 | 67,579 | 2,800 | - | - | 5,209 | - | - | - | 104,172 | 170 | 589,381 |
| 2b.0 | TOTAL PERIOD 2b COST | 7,623 | 30,935 | 1,242 | 3,063 | 16,641 | 21,617 | 113,934 | 35,690 | 230,744 | 164,147 | 63,153 | 3,444 | 101,580 | 115,021 | - | - | - | 9,282,851 | 390,587 | 591,132 |
| PERIOD 2d - Decontamination Following Wet Fuel Storage | | | | | | | | | | | | | | | | | | | | | |
| Period 2d Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| 2d.1.1 | Remove spent fuel racks | 347 | 35 | 86 | 41 | - | 703 | - | 373 | 1,585 | 1,585 | - | - | - | 2,092 | - | - | - | 132,919 | 576 | - |
| Disposal of Plant Systems | | | | | | | | | | | | | | | | | | | | | |
| 2d.1.2.1 | Electrical - Contaminated - Fuel Pool | - | 203 | 2 | 7 | 145 | 11 | - | 77 | 445 | 445 | - | - | 864 | 33 | - | - | - | 37,167 | 2,783 | - |
| 2d.1.2.2 | Electrical - Decontaminated - Fuel Pool | - | 1,269 | 17 | 59 | 1,350 | - | - | 530 | 3,225 | 3,225 | - | - | 8,069 | - | - | - | - | 327,668 | 16,495 | - |
| 2d.1.2.3 | Fire Protection & Detection - RCA Fuel P | - | 37 | 1 | 2 | 48 | - | - | 17 | 105 | 105 | - | - | 286 | - | - | - | - | 11,622 | 476 | - |
| 2d.1.2.4 | HVAC - Contaminated - Fuel Pool | - | 553 | 13 | 39 | 808 | 61 | - | 282 | 1,756 | 1,756 | - | - | 4,828 | 182 | - | - | - | 207,612 | 7,448 | - |
| 2d.1.2.5 | Safeguards Chilled Water - RCA | - | 5 | 0 | 0 | 4 | - | - | 2 | 11 | 11 | - | - | 26 | - | - | - | - | 1,045 | 51 | - |
| 2d.1.2.6 | Spent Fuel Pool Cooling | 32 | 36 | 3 | 2 | 6 | 37 | - | 36 | 152 | 152 | - | - | 39 | 107 | - | - | - | 8,481 | 882 | - |
| 2d.1.2.7 | Spent Fuel Pool Normal Ventilation | - | 27 | 1 | 2 | 44 | 4 | - | 15 | 93 | 93 | - | - | 265 | 12 | - | - | - | 11,505 | 394 | - |
| 2d.1.2 | Totals | 32 | 2,130 | 36 | 112 | 2,405 | 113 | - | 958 | 5,786 | 5,786 | - | - | 14,376 | 333 | - | - | - | 605,100 | 28,530 | - |
| Decontamination of Site Buildings | | | | | | | | | | | | | | | | | | | | | |
| 2d.1.3.1 | Fuel Handling of Aux Building | 1,029 | 1,138 | 13 | 45 | 404 | 195 | - | 916 | 3,741 | 3,741 | - | - | 2,417 | 1,652 | - | - | - | 177,755 | 30,404 | - |
| 2d.1.3 | Totals | 1,029 | 1,138 | 13 | 45 | 404 | 195 | - | 916 | 3,741 | 3,741 | - | - | 2,417 | 1,652 | - | - | - | 177,755 | 30,404 | - |
| 2d.1.4 | Scaffolding in support of decommissioning | - | 755 | 5 | 3 | 47 | 7 | - | 199 | 1,016 | 1,016 | - | - | 253 | 22 | - | - | - | 12,804 | 6,567 | - |
| 2d.1 | Subtotal Period 2d Activity Costs | 1,408 | 4,058 | 141 | 202 | 2,857 | 1,018 | - | 2,445 | 12,128 | 12,128 | - | - | 17,046 | 4,099 | - | - | - | 928,579 | 66,078 | - |
| Period 2d Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 2d.2.1 | License Termination Survey Planning | - | - | - | - | - | - | 1,037 | 311 | 1,348 | 1,348 | - | - | - | - | - | - | - | - | - | 6,240 |
| 2d.2 | Subtotal Period 2d Additional Costs | - | - | - | - | - | - | 1,037 | 311 | 1,348 | 1,348 | - | - | - | - | - | - | - | - | - | 6,240 |
| Period 2d Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 2d.3.1 | Process decommissioning water waste | 45 | - | 31 | 56 | - | 126 | - | 65 | 323 | 323 | - | - | - | 288 | - | - | - | 17,293 | 56 | - |
| 2d.3.2 | Process decommissioning chemical flush waste | 0 | - | 1 | 5 | - | 10 | - | 3 | 20 | 20 | - | - | - | 13 | - | - | - | 1,422 | 2 | - |
| 2d.3.3 | Small tool allowance | - | 83 | - | - | - | - | - | 12 | 95 | 95 | - | - | - | - | - | - | - | - | - | - |
| 2d.3.4 | Decommissioning Equipment Disposition | - | - | 130 | 67 | 1,112 | 178 | - | 234 | 1,722 | 1,722 | - | - | 6,000 | 529 | - | - | - | 303,608 | 147 | - |
| 2d.3.5 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 975 | - | 975 | - | 975 | - | - | - | - | - | - | - | - | - |
| 2d.3 | Subtotal Period 2d Collateral Costs | 45 | 83 | 162 | 128 | 1,112 | 314 | 975 | 316 | 3,135 | 2,160 | 975 | - | 6,000 | 831 | - | - | - | 322,324 | 206 | - |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table E-2
Prairie Island DECON Unit 2
DECON Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|---|---------------|---------------|-----------------|-----------------|---------------------------|---------------------|----------------|-------------------|----------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| Period 2d Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 2d.4.1 | Decon supplies | 236 | - | - | - | - | - | - | 59 | 295 | 295 | - | - | - | - | - | - | - | - | - | - |
| 2d.4.2 | Insurance | - | - | - | - | - | - | 378 | 38 | 416 | 416 | - | - | - | - | - | - | - | - | - | - |
| 2d.4.3 | Property taxes | - | - | - | - | - | - | 2,004 | 200 | 2,204 | 2,204 | - | - | - | - | - | - | - | - | - | - |
| 2d.4.4 | Health physics supplies | - | 794 | - | - | - | - | - | 198 | 992 | 992 | - | - | - | - | - | - | - | - | - | - |
| 2d.4.5 | Heavy equipment rental | - | 2,007 | - | - | - | - | - | 301 | 2,308 | 2,308 | - | - | - | - | - | - | - | - | - | - |
| 2d.4.6 | Disposal of DAW generated | - | - | 40 | 16 | - | 165 | - | 48 | 268 | 268 | - | - | - | 2,002 | - | - | - | 40,031 | 65 | - |
| 2d.4.7 | Plant energy budget | - | - | - | - | - | - | 506 | 76 | 582 | 582 | - | - | - | - | - | - | - | - | - | - |
| 2d.4.8 | NRC Fees | - | - | - | - | - | - | 277 | 28 | 305 | 305 | - | - | - | - | - | - | - | - | - | - |
| 2d.4.9 | Emergency Planning Fees | - | - | - | - | - | - | 58 | 6 | 64 | - | 64 | - | - | - | - | - | - | - | - | - |
| 2d.4.10 | Fixed Overhead | - | - | - | - | - | - | 929 | 139 | 1,068 | 1,068 | - | - | - | - | - | - | - | - | - | - |
| 2d.4.11 | Liquid Radwaste Processing Equipment/Services | - | - | - | - | - | - | 332 | 50 | 381 | 381 | - | - | - | - | - | - | - | - | - | - |
| 2d.4.12 | ISFSI Operating Costs | - | - | - | - | - | - | 44 | 7 | 50 | - | 50 | - | - | - | - | - | - | - | - | - |
| 2d.4.13 | Railroad Track Maintenance | - | - | - | - | - | - | 49 | 7 | 56 | 56 | - | - | - | - | - | - | - | - | - | - |
| 2d.4.14 | Remedial Actions Surveys | - | - | - | - | - | - | 875 | 131 | 1,006 | 1,006 | - | - | - | - | - | - | - | - | - | - |
| 2d.4.15 | Security Staff Cost | - | - | - | - | - | - | 5,782 | 867 | 6,649 | 4,694 | 1,955 | - | - | - | - | - | - | - | - | 84,454 |
| 2d.4.16 | DOC Staff Cost | - | - | - | - | - | - | 6,401 | 960 | 7,361 | 7,361 | - | - | - | - | - | - | - | - | - | 70,243 |
| 2d.4.17 | Utility Staff Cost | - | - | - | - | - | - | 8,100 | 1,215 | 9,315 | 8,858 | 456 | - | - | - | - | - | - | - | - | 126,681 |
| 2d.4 | Subtotal Period 2d Period-Dependent Costs | 236 | 2,801 | 40 | 16 | - | 165 | - | 4,330 | 33,321 | 30,796 | 2,525 | - | - | 2,002 | - | - | - | 40,031 | 65 | 281,377 |
| 2d.0 | TOTAL PERIOD 2d COST | 1,689 | 6,941 | 343 | 346 | 3,969 | 1,496 | 27,746 | 7,403 | 49,932 | 46,432 | 3,501 | - | 23,046 | 6,931 | - | - | - | 1,290,933 | 66,348 | 287,617 |
| PERIOD 2f - License Termination | | | | | | | | | | | | | | | | | | | | | |
| Period 2f Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| 2f.1.1 | ORISE confirmatory survey | - | - | - | - | - | - | 166 | 50 | 216 | 216 | - | - | - | - | - | - | - | - | - | - |
| 2f.1.2 | Terminate license | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 2f.1 | Subtotal Period 2f Activity Costs | - | - | - | - | - | - | 166 | 50 | 216 | 216 | - | - | - | - | - | - | - | - | - | - |
| Period 2f Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 2f.2.1 | License Termination Survey | - | - | - | - | - | - | 7,041 | 2,112 | 9,154 | 9,154 | - | - | - | - | - | - | - | - | 100,895 | 3,120 |
| 2f.2 | Subtotal Period 2f Additional Costs | - | - | - | - | - | - | 7,041 | 2,112 | 9,154 | 9,154 | - | - | - | - | - | - | - | - | 100,895 | 3,120 |
| Period 2f Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 2f.3.1 | DOC staff relocation expenses | - | - | - | - | - | - | 1,264 | 190 | 1,454 | 1,454 | - | - | - | - | - | - | - | - | - | - |
| 2f.3.2 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 934 | - | 934 | - | 934 | - | - | - | - | - | - | - | - | - |
| 2f.3 | Subtotal Period 2f Collateral Costs | - | - | - | - | - | - | 2,198 | 190 | 2,388 | 1,454 | 934 | - | - | - | - | - | - | - | - | - |
| Period 2f Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 2f.4.1 | Insurance | - | - | - | - | - | - | 362 | 36 | 398 | 398 | - | - | - | - | - | - | - | - | - | - |
| 2f.4.2 | Property taxes | - | - | - | - | - | - | 1,771 | 177 | 1,948 | 1,948 | - | - | - | - | - | - | - | - | - | - |
| 2f.4.3 | Health physics supplies | - | 710 | - | - | - | - | - | 178 | 888 | 888 | - | - | - | - | - | - | - | - | - | - |
| 2f.4.4 | Disposal of DAW generated | - | - | 7 | 3 | - | 28 | - | 8 | 45 | 45 | - | - | - | 334 | - | - | - | 6,685 | 11 | - |
| 2f.4.5 | Plant energy budget | - | - | - | - | - | - | 243 | 36 | 279 | 279 | - | - | - | - | - | - | - | - | - | - |
| 2f.4.6 | NRC Fees | - | - | - | - | - | - | 263 | 26 | 290 | 290 | - | - | - | - | - | - | - | - | - | - |
| 2f.4.7 | Emergency Planning Fees | - | - | - | - | - | - | 55 | 6 | 61 | - | 61 | - | - | - | - | - | - | - | - | - |
| 2f.4.8 | Fixed Overhead | - | - | - | - | - | - | 890 | 133 | 1,023 | 1,023 | - | - | - | - | - | - | - | - | - | - |
| 2f.4.9 | ISFSI Operating Costs | - | - | - | - | - | - | 42 | 6 | 48 | - | 48 | - | - | - | - | - | - | - | - | - |
| 2f.4.10 | Railroad Track Maintenance | - | - | - | - | - | - | 47 | 7 | 54 | 54 | - | - | - | - | - | - | - | - | - | - |
| 2f.4.11 | Security Staff Cost | - | - | - | - | - | - | 5,538 | 831 | 6,369 | 4,497 | 1,873 | - | - | - | - | - | - | - | - | 80,898 |
| 2f.4.12 | DOC Staff Cost | - | - | - | - | - | - | 4,238 | 636 | 4,874 | 4,874 | - | - | - | - | - | - | - | - | - | 46,283 |
| 2f.4.13 | Utility Staff Cost | - | - | - | - | - | - | 4,011 | 602 | 4,613 | 4,175 | 438 | - | - | - | - | - | - | - | - | 59,507 |
| 2f.4 | Subtotal Period 2f Period-Dependent Costs | - | 710 | 7 | 3 | - | 28 | 17,461 | 2,682 | 20,890 | 18,470 | 2,420 | - | - | 334 | - | - | - | 6,685 | 11 | 186,687 |
| 2f.0 | TOTAL PERIOD 2f COST | - | 710 | 7 | 3 | - | 28 | 26,867 | 5,034 | 32,648 | 29,294 | 3,354 | - | - | 334 | - | - | - | 6,685 | 100,906 | 189,807 |
| PERIOD 2 TOTALS | | 10,081 | 70,482 | 21,208 | 7,682 | 26,615 | 44,663 | 266,032 | 90,058 | 536,819 | 439,560 | 90,851 | 6,408 | 163,252 | 160,871 | 237 | 673 | - | 14,979,540 | 770,436 | 1,879,206 |
| PERIOD 3b - Site Restoration | | | | | | | | | | | | | | | | | | | | | |
| Period 3b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| Demolition of Remaining Site Buildings | | | | | | | | | | | | | | | | | | | | | |
| 3b.1.1.1 | Reactor | - | 4,645 | - | - | - | - | - | 697 | 5,342 | - | - | 5,342 | - | - | - | - | - | - | 44,679 | - |
| 3b.1.1.2 | Auxiliary | - | 1,993 | - | - | - | - | - | 299 | 2,291 | - | - | 2,291 | - | - | - | - | - | - | 11,902 | - |
| 3b.1.1.3 | Condensate Storage Tank Foundation | - | 7 | - | - | - | - | - | 1 | 8 | - | - | 8 | - | - | - | - | - | - | 33 | - |
| 3b.1.1.4 | Construction Warehouse & Fab Shop | - | 130 | - | - | - | - | - | 19 | 149 | - | - | 149 | - | - | - | - | - | - | 1,405 | - |
| 3b.1.1.5 | D3/D4 Emergency Generator | - | 14 | - | - | - | - | - | 2 | 16 | - | - | 16 | - | - | - | - | - | - | 84 | - |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table E-2
Prairie Island DECON Unit 2
DECON Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| Demolition of Remaining Site Buildings (continued) | | | | | | | | | | | | | | | | | | | | | |
| 3b.1.1.6 | Drum Transfer & Truck Loading Enclosure | - | 20 | - | - | - | - | - | 3 | 24 | - | - | 24 | - | - | - | - | - | - | 221 | - |
| 3b.1.1.7 | Hydrogen House | - | 6 | - | - | - | - | - | 1 | 7 | - | - | 7 | - | - | - | - | - | - | 47 | - |
| 3b.1.1.8 | LLRW Storage Enclosure | - | 128 | - | - | - | - | - | 19 | 147 | - | - | 147 | - | - | - | - | - | - | 853 | - |
| 3b.1.1.9 | Misc Structures 2017 | - | 2,617 | - | - | - | - | - | 393 | 3,009 | - | - | 3,009 | - | - | - | - | - | - | 22,582 | - |
| 3b.1.1.10 | Radwaste | - | 176 | - | - | - | - | - | 26 | 202 | - | - | 202 | - | - | - | - | - | - | 1,400 | - |
| 3b.1.1.11 | Resin Disposal | - | 14 | - | - | - | - | - | 2 | 16 | - | - | 16 | - | - | - | - | - | - | 120 | - |
| 3b.1.1.12 | Structures below 3' below grade | - | 1,785 | - | - | - | - | - | 268 | 2,052 | - | - | 2,052 | - | - | - | - | - | - | 9,238 | - |
| 3b.1.1.13 | Sulfuric Acid Tank Enclosure | - | 3 | - | - | - | - | - | 0 | 4 | - | - | 4 | - | - | - | - | - | - | 35 | - |
| 3b.1.1.14 | Turbine | - | 2,140 | - | - | - | - | - | 321 | 2,461 | - | - | 2,461 | - | - | - | - | - | - | 21,997 | - |
| 3b.1.1.15 | Turbine Pedestal | - | 365 | - | - | - | - | - | 55 | 420 | - | - | 420 | - | - | - | - | - | - | 1,857 | - |
| 3b.1.1.16 | Warehouse #2 | - | 24 | - | - | - | - | - | 4 | 27 | - | - | 27 | - | - | - | - | - | - | 213 | - |
| 3b.1.1.17 | Waste Neutralizing Tank House | - | 7 | - | - | - | - | - | 1 | 8 | - | - | 8 | - | - | - | - | - | - | 56 | - |
| 3b.1.1.18 | Waste Oil Storage | - | 9 | - | - | - | - | - | 1 | 10 | - | - | 10 | - | - | - | - | - | - | 70 | - |
| 3b.1.1.19 | Water Treatment | - | 324 | - | - | - | - | - | 49 | 373 | - | - | 373 | - | - | - | - | - | - | 2,690 | - |
| 3b.1.1.20 | Fuel Handling of Aux Building | - | 1,095 | - | - | - | - | - | 164 | 1,259 | - | - | 1,259 | - | - | - | - | - | - | 8,240 | - |
| 3b.1.1 | Totals | - | 15,501 | - | - | - | - | - | 2,325 | 17,826 | - | - | 17,826 | - | - | - | - | - | - | 127,723 | - |
| Site Closeout Activities | | | | | | | | | | | | | | | | | | | | | |
| 3b.1.2 | Remove Rubble | - | 1,330 | - | - | - | - | - | 200 | 1,530 | - | - | 1,530 | - | - | - | - | - | - | 6,495 | - |
| 3b.1.3 | Grade & landscape site | - | 448 | - | - | - | - | - | 67 | 515 | - | - | 515 | - | - | - | - | - | - | 921 | - |
| 3b.1.4 | Final report to NRC | - | - | - | - | - | - | 86 | 13 | 99 | 99 | - | - | - | - | - | - | - | - | - | 667 |
| 3b.1 | Subtotal Period 3b Activity Costs | - | 17,279 | - | - | - | - | 86 | 2,605 | 19,969 | 99 | - | 19,871 | - | - | - | - | - | - | 135,138 | 667 |
| Period 3b Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 3b.2.1 | Clean Concrete Disposal | - | 4,912 | - | - | - | - | 10 | 738 | 5,660 | - | - | 5,660 | - | - | - | - | - | - | 18,372 | - |
| 3b.2.2 | Intake Structure Cofferdam | - | 442 | - | - | - | - | - | 66 | 508 | - | - | 508 | - | - | - | - | - | - | 3,552 | - |
| 3b.2.3 | Construction Debris | - | - | - | - | - | - | 2,150 | 323 | 2,473 | - | - | 2,473 | - | - | - | - | - | - | - | - |
| 3b.2.4 | Backfill | - | 9,257 | - | - | - | - | - | 1,388 | 10,645 | - | - | 10,645 | - | - | - | - | - | - | 9,327 | - |
| 3b.2.5 | Disposition of Original Casks | - | 24 | 80 | 418 | - | 2,390 | - | 728 | 3,640 | 3,640 | - | - | - | 8,929 | - | - | - | 1,059,612 | 146 | - |
| 3b.2 | Subtotal Period 3b Additional Costs | - | 14,634 | 80 | 418 | - | 2,390 | 2,160 | 3,244 | 22,926 | 3,640 | - | 19,286 | - | 8,929 | - | - | - | 1,059,612 | 31,397 | - |
| Period 3b Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 3b.3.1 | Small tool allowance | - | 212 | - | - | - | - | - | 32 | 244 | - | - | 244 | - | - | - | - | - | - | - | - |
| 3b.3.2 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 2,649 | - | 2,649 | - | 2,649 | - | - | - | - | - | - | - | - | - |
| 3b.3 | Subtotal Period 3b Collateral Costs | - | 212 | - | - | - | - | 2,649 | 32 | 2,893 | - | 2,649 | 244 | - | - | - | - | - | - | - | - |
| Period 3b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 3b.4.1 | Insurance | - | - | - | - | - | - | 513 | 51 | 565 | 565 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.2 | Property taxes | - | - | - | - | - | - | 4,167 | 417 | 4,583 | - | 4,583 | - | - | - | - | - | - | - | - | - |
| 3b.4.3 | Heavy equipment rental | - | 7,144 | - | - | - | - | - | 1,072 | 8,215 | - | - | 8,215 | - | - | - | - | - | - | - | - |
| 3b.4.4 | Plant energy budget | - | - | - | - | - | - | 344 | 52 | 395 | - | 395 | - | - | - | - | - | - | - | - | - |
| 3b.4.5 | NRC ISFSI Fees | - | - | - | - | - | - | 218 | 22 | 239 | - | 239 | - | - | - | - | - | - | - | - | - |
| 3b.4.6 | Emergency Planning Fees | - | - | - | - | - | - | 157 | 16 | 173 | - | 173 | - | - | - | - | - | - | - | - | - |
| 3b.4.7 | Fixed Overhead | - | - | - | - | - | - | 1,024 | 154 | 1,178 | 397 | 781 | - | - | - | - | - | - | - | - | - |
| 3b.4.8 | ISFSI Operating Costs | - | - | - | - | - | - | 119 | 18 | 136 | - | 136 | - | - | - | - | - | - | - | - | - |
| 3b.4.9 | Railroad Track Maintenance | - | - | - | - | - | - | 361 | 54 | 416 | 153 | 263 | - | - | - | - | - | - | - | - | - |
| 3b.4.10 | Security Staff Cost | - | - | - | - | - | - | 4,616 | 692 | 5,308 | - | 5,308 | - | - | - | - | - | - | - | - | 57,340 |
| 3b.4.11 | DOC Staff Cost | - | - | - | - | - | - | 10,921 | 1,638 | 12,559 | - | - | 12,559 | - | - | - | - | - | - | - | 116,885 |
| 3b.4.12 | Utility Staff Cost | - | - | - | - | - | - | 5,170 | 776 | 5,946 | - | 1,278 | 4,668 | - | - | - | - | - | - | - | 76,637 |
| 3b.4 | Subtotal Period 3b Period-Dependent Costs | - | 7,144 | - | - | - | - | 27,610 | 4,960 | 39,714 | 1,114 | 13,158 | 25,442 | - | - | - | - | - | - | - | 250,861 |
| 3b.0 | TOTAL PERIOD 3b COST | - | 39,269 | 80 | 418 | - | 2,390 | 32,505 | 10,840 | 85,502 | 4,853 | 15,807 | 64,843 | - | 8,929 | - | - | - | 1,059,612 | 166,534 | 251,528 |
| PERIOD 3c - Fuel Storage Operations/Shipping | | | | | | | | | | | | | | | | | | | | | |
| Period 3c Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| Period 3c Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 3c.3.1 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 270,755 | 40,613 | 311,368 | - | 311,368 | - | - | - | - | - | - | - | - | - |
| 3c.3.2 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 94,360 | - | 94,360 | - | 94,360 | - | - | - | - | - | - | - | - | - |
| 3c.3 | Subtotal Period 3c Collateral Costs | - | - | - | - | - | - | 365,115 | 40,613 | 405,728 | - | 405,728 | - | - | - | - | - | - | - | - | - |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table E-2
Prairie Island DECON Unit 2
DECON Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|-----------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| Period 3c Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3c.4.1 | Insurance | - | - | - | - | - | - | 18,290 | 1,829 | 20,119 | - | 20,119 | - | - | - | - | - | - | - | - | - | - |
| 3c.4.2 | Property taxes | - | - | - | - | - | - | 104,580 | 10,458 | 115,038 | - | 115,038 | - | - | - | - | - | - | - | - | - | - |
| 3c.4.4 | NRC ISFSI Fees | - | - | - | - | - | - | 9,306 | 931 | 10,237 | - | 10,237 | - | - | - | - | - | - | - | - | - | - |
| 3c.4.5 | Emergency Planning Fees | - | - | - | - | - | - | 5,600 | 560 | 6,160 | - | 6,160 | - | - | - | - | - | - | - | - | - | - |
| 3c.4.6 | Fixed Overhead | - | - | - | - | - | - | 12,308 | 1,846 | 14,155 | - | 14,155 | - | - | - | - | - | - | - | - | - | - |
| 3c.4.7 | ISFSI Operating Costs | - | - | - | - | - | - | 4,228 | 634 | 4,862 | - | 4,862 | - | - | - | - | - | - | - | - | - | - |
| 3c.4.8 | Railroad Track Maintenance | - | - | - | - | - | - | 4,723 | 708 | 5,431 | - | 5,431 | - | - | - | - | - | - | - | - | - | - |
| 3c.4.9 | Security Staff Cost | - | - | - | - | - | - | 164,428 | 24,664 | 189,092 | - | 189,092 | - | - | - | - | - | - | - | - | - | 2,042,594 |
| 3c.4.10 | DOC Staff Cost | - | - | - | - | - | - | 11,579 | 1,737 | 13,316 | - | 13,316 | - | - | - | - | - | - | - | - | - | 78,561 |
| 3c.4.11 | Utility Staff Cost | - | - | - | - | - | - | 71,292 | 10,694 | 81,986 | - | 81,986 | - | - | - | - | - | - | - | - | - | 1,040,937 |
| 3c.4 | Subtotal Period 3c Period-Dependent Costs | - | - | - | - | - | - | 406,334 | 54,061 | 460,395 | - | 460,395 | - | - | - | - | - | - | - | - | - | 3,162,093 |
| 3c.0 | TOTAL PERIOD 3c COST | - | - | - | - | - | - | 771,448 | 94,674 | 866,123 | - | 866,123 | - | - | - | - | - | - | - | - | - | 3,162,093 |
| PERIOD 3d - GTCC shipping | | | | | | | | | | | | | | | | | | | | | | |
| Period 3d Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Nuclear Steam Supply System Removal | | | | | | | | | | | | | | | | | | | | | | |
| 3d.1.1.1 | Vessel & Internals GTCC Disposal | - | - | 1,444 | - | - | 8,680 | - | 1,663 | 11,787 | 11,787 | - | - | - | - | - | - | 1,773 | 344,823 | - | - | - |
| 3d.1.1 | Totals | - | - | 1,444 | - | - | 8,680 | - | 1,663 | 11,787 | 11,787 | - | - | - | - | - | - | 1,773 | 344,823 | - | - | - |
| 3d.1 | Subtotal Period 3d Activity Costs | - | - | 1,444 | - | - | 8,680 | - | 1,663 | 11,787 | 11,787 | - | - | - | - | - | - | 1,773 | 344,823 | - | - | - |
| Period 3d Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3d.3.1 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 28 | 4 | 32 | - | 32 | - | - | - | - | - | - | - | - | - | - |
| 3d.3.2 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 48 | - | 48 | - | 48 | - | - | - | - | - | - | - | - | - | - |
| 3d.3 | Subtotal Period 3d Collateral Costs | - | - | - | - | - | - | 76 | 4 | 80 | - | 80 | - | - | - | - | - | - | - | - | - | - |
| Period 3d Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3d.4.1 | Insurance | - | - | - | - | - | - | 9 | 1 | 10 | 10 | - | - | - | - | - | - | - | - | - | - | - |
| 3d.4.2 | Property taxes | - | - | - | - | - | - | 53 | 5 | 58 | 58 | - | - | - | - | - | - | - | - | - | - | - |
| 3d.4.4 | NRC ISFSI Fees | - | - | - | - | - | - | 4 | 0 | 4 | - | 4 | - | - | - | - | - | - | - | - | - | - |
| 3d.4.5 | Emergency Planning Fees | - | - | - | - | - | - | 3 | 0 | 3 | - | 3 | - | - | - | - | - | - | - | - | - | - |
| 3d.4.6 | Fixed Overhead | - | - | - | - | - | - | 6 | 1 | 7 | 7 | - | - | - | - | - | - | - | - | - | - | - |
| 3d.4.7 | Railroad Track Maintenance | - | - | - | - | - | - | 2 | 0 | 3 | 3 | - | - | - | - | - | - | - | - | - | - | - |
| 3d.4.8 | Security Staff Cost | - | - | - | - | - | - | 83 | 13 | 96 | 96 | - | - | - | - | - | - | - | - | - | - | 1,037 |
| 3d.4.9 | Utility Staff Cost | - | - | - | - | - | - | 19 | 3 | 22 | 22 | - | - | - | - | - | - | - | - | - | - | 269 |
| 3d.4 | Subtotal Period 3d Period-Dependent Costs | - | - | - | - | - | - | 181 | 24 | 204 | 197 | 7 | - | - | - | - | - | - | - | - | - | 1,306 |
| 3d.0 | TOTAL PERIOD 3d COST | - | - | 1,444 | - | - | 8,680 | 256 | 1,691 | 12,071 | 11,984 | 87 | - | - | - | - | - | 1,773 | 344,823 | - | - | 1,306 |
| PERIOD 3e - ISFSI Decontamination | | | | | | | | | | | | | | | | | | | | | | |
| Period 3e Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Period 3e Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3e.2.1 | License Termination ISFSI | - | 0 | 2 | 17 | - | 142 | 1,197 | 339 | 1,696 | 1,696 | - | - | - | 424 | - | - | - | 65,754 | 5,882 | 1,161 | - |
| 3e.2 | Subtotal Period 3e Additional Costs | - | 0 | 2 | 17 | - | 142 | 1,197 | 339 | 1,696 | 1,696 | - | - | - | 424 | - | - | - | 65,754 | 5,882 | 1,161 | - |
| Period 3e Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3e.4.1 | Insurance | - | - | - | - | - | - | 93 | 23 | 116 | 116 | - | - | - | - | - | - | - | - | - | - | - |
| 3e.4.2 | Property taxes | - | - | - | - | - | - | 56 | 14 | 69 | 69 | - | - | - | - | - | - | - | - | - | - | - |
| 3e.4.3 | Plant energy budget | - | - | - | - | - | - | 11 | 3 | 13 | 13 | - | - | - | - | - | - | - | - | - | - | - |
| 3e.4.4 | Fixed Overhead | - | - | - | - | - | - | 54 | 14 | 68 | 68 | - | - | - | - | - | - | - | - | - | - | - |
| 3e.4.5 | Railroad Track Maintenance | - | - | - | - | - | - | 21 | 5 | 26 | 26 | - | - | - | - | - | - | - | - | - | - | - |
| 3e.4.6 | Security Staff Cost | - | - | - | - | - | - | 174 | 43 | 217 | 217 | - | - | - | - | - | - | - | - | - | - | 2,500 |
| 3e.4.7 | Utility Staff Cost | - | - | - | - | - | - | 129 | 32 | 161 | 161 | - | - | - | - | - | - | - | - | - | - | 1,896 |
| 3e.4 | Subtotal Period 3e Period-Dependent Costs | - | - | - | - | - | - | 536 | 134 | 670 | 670 | - | - | - | - | - | - | - | - | - | - | 4,396 |
| 3e.0 | TOTAL PERIOD 3e COST | - | 0 | 2 | 17 | - | 142 | 1,733 | 473 | 2,367 | 2,367 | - | - | - | 424 | - | - | - | 65,754 | 5,882 | 1,161 | 5,556 |

**Prairie Island Nuclear Generating Plant
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**Table E-2
Prairie Island DECON Unit 2
DECON Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|-------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| PERIOD 3f - ISFSI Site Restoration | | | | | | | | | | | | | | | | | | | | | | |
| Period 3f Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Period 3f Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3f.2.1 | Demolition and Site Restoration of ISFSI | - | 1,121 | - | - | - | - | 161 | 192 | 1,474 | - | - | 1,474 | - | - | - | - | - | - | - | 4,846 | 80 |
| 3f.2 | Subtotal Period 3f Additional Costs | - | 1,121 | - | - | - | - | 161 | 192 | 1,474 | - | - | 1,474 | - | - | - | - | - | - | - | 4,846 | 80 |
| Period 3f Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3f.3.1 | Small tool allowance | - | 7 | - | - | - | - | - | 1 | 8 | - | - | 8 | - | - | - | - | - | - | - | - | - |
| 3f.3 | Subtotal Period 3f Collateral Costs | - | 7 | - | - | - | - | - | 1 | 8 | - | - | 8 | - | - | - | - | - | - | - | - | - |
| Period 3f Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3f.4.2 | Property taxes | - | - | - | - | - | - | 28 | 3 | 31 | - | - | 31 | - | - | - | - | - | - | - | - | - |
| 3f.4.3 | Heavy equipment rental | - | 59 | - | - | - | - | - | 9 | 68 | - | - | 68 | - | - | - | - | - | - | - | - | - |
| 3f.4.4 | Plant energy budget | - | - | - | - | - | - | 6 | 1 | 6 | - | - | 6 | - | - | - | - | - | - | - | - | - |
| 3f.4.5 | Fixed Overhead | - | - | - | - | - | - | 28 | 4 | 32 | - | - | 32 | - | - | - | - | - | - | - | - | - |
| 3f.4.6 | Railroad Track Maintenance | - | - | - | - | - | - | 11 | 2 | 12 | - | - | 12 | - | - | - | - | - | - | - | - | - |
| 3f.4.7 | Security Staff Cost | - | - | - | - | - | - | 89 | 13 | 102 | - | - | 102 | - | - | - | - | - | - | - | - | 1,281 |
| 3f.4.8 | Utility Staff Cost | - | - | - | - | - | - | 55 | 8 | 63 | - | - | 63 | - | - | - | - | - | - | - | - | 795 |
| 3f.4 | Subtotal Period 3f Period-Dependent Costs | - | 59 | - | - | - | - | 216 | 40 | 315 | - | - | 315 | - | - | - | - | - | - | - | - | 2,076 |
| 3f.0 | TOTAL PERIOD 3f COST | - | 1,187 | - | - | - | - | 377 | 233 | 1,798 | - | - | 1,798 | - | - | - | - | - | - | - | 4,846 | 2,156 |
| PERIOD 3 TOTALS | | - | 40,456 | 1,525 | 435 | - | 11,212 | 806,320 | 107,912 | 967,861 | 19,203 | 882,017 | 66,641 | - | 9,353 | - | - | 1,773 | 1,470,189 | 177,262 | 3,422,639 | |
| TOTAL COST TO DECOMMISSION | | 13,876 | 116,855 | 23,184 | 8,596 | 26,793 | 61,273 | 1,178,883 | 216,817 | 1,646,275 | 591,409 | 981,137 | 73,730 | 169,384 | 184,108 | 826 | 673 | 1,773 | 17,058,250 | 981,176 | 6,101,073 | |

| | | |
|--|--------------------|----------------------------------|
| TOTAL COST TO DECOMMISSION WITH 15.17% CONTINGENCY: | \$1,646,275 | thousands of 2020 dollars |
| TOTAL NRC LICENSE TERMINATION COST IS 35.92% OR: | \$591,409 | thousands of 2020 dollars |
| SPENT FUEL MANAGEMENT COST IS 59.6% OR: | \$981,137 | thousands of 2020 dollars |
| NON-NUCLEAR DEMOLITION COST IS 4.48% OR: | \$73,730 | thousands of 2020 dollars |
| TOTAL LOW-LEVEL RADIOACTIVE WASTE VOLUME BURIED (EXCLUDING GTCC): | 185,606 | Cubic Feet |
| TOTAL GREATER THAN CLASS C RADWASTE VOLUME GENERATED: | 1,773 | Cubic Feet |
| TOTAL SCRAP METAL REMOVED: | 42,328 | Tons |
| TOTAL CRAFT LABOR REQUIREMENTS: | 981,176 | Man-hours |

End Notes:
n/a - indicates that this activity not charged as decommissioning expense
a - indicates that this activity performed by decommissioning staff
0 - indicates that this value is less than 0.5 but is non-zero
A cell containing " - " indicates a zero value

***Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis***

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APPENDIX F

DETAILED COST ANALYSIS

SCENARIO 4: DECON with 200 Year DFS

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| Prairie Island Nuclear Generating Plant, Unit 2 | F-11 |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table F-1
Prairie Island DECON Unit 1
DECON Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|--|--|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| PERIOD 1a - Shutdown through Transition | | | | | | | | | | | | | | | | | | | | | |
| Period 1a Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| 1a.1.1 | Prepare preliminary decommissioning cost | - | - | - | - | - | - | 167 | 25 | 192 | 192 | - | - | - | - | - | - | - | - | - | 1,300 |
| 1a.1.2 | Notification of Cessation of Operations | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.3 | Remove fuel & source material | - | - | - | - | - | - | - | - | n/a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.4 | Notification of Permanent Defueling | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.5 | Deactivate plant systems & process waste | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.6 | Prepare and submit PSDAR | - | - | - | - | - | - | 257 | 39 | 296 | 296 | - | - | - | - | - | - | - | - | - | 2,000 |
| 1a.1.7 | Review plant dwgs & specs. | - | - | - | - | - | - | 591 | 89 | 680 | 680 | - | - | - | - | - | - | - | - | - | 4,600 |
| 1a.1.8 | Perform detailed rad survey | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.9 | Estimate by-product inventory | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| 1a.1.10 | End product description | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| 1a.1.11 | Detailed by-product inventory | - | - | - | - | - | - | 167 | 25 | 192 | 192 | - | - | - | - | - | - | - | - | - | 1,300 |
| 1a.1.12 | Define major work sequence | - | - | - | - | - | - | 964 | 145 | 1,108 | 1,108 | - | - | - | - | - | - | - | - | - | 7,500 |
| 1a.1.13 | Perform SER and EA | - | - | - | - | - | - | 398 | 60 | 458 | 458 | - | - | - | - | - | - | - | - | - | 3,100 |
| 1a.1.14 | Prepare/submit Defueled Technical Specifications | - | - | - | - | - | - | 964 | 145 | 1,108 | 1,108 | - | - | - | - | - | - | - | - | - | 7,500 |
| 1a.1.15 | Perform Site-Specific Cost Study | - | - | - | - | - | - | 643 | 96 | 739 | 739 | - | - | - | - | - | - | - | - | - | 5,000 |
| 1a.1.16 | Prepare/submit Irradiated Fuel Management Plan | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| Activity Specifications | | | | | | | | | | | | | | | | | | | | | |
| 1a.1.17.1 | Plant & temporary facilities | - | - | - | - | - | - | 632 | 95 | 727 | 654 | - | 73 | - | - | - | - | - | - | - | 4,920 |
| 1a.1.17.2 | Plant systems | - | - | - | - | - | - | 536 | 80 | 616 | 554 | - | 62 | - | - | - | - | - | - | - | 4,167 |
| 1a.1.17.3 | NSSS Decontamination Flush | - | - | - | - | - | - | 64 | 10 | 74 | 74 | - | - | - | - | - | - | - | - | - | 500 |
| 1a.1.17.4 | Reactor internals | - | - | - | - | - | - | 912 | 137 | 1,049 | 1,049 | - | - | - | - | - | - | - | - | - | 7,100 |
| 1a.1.17.5 | Reactor vessel | - | - | - | - | - | - | 835 | 125 | 961 | 961 | - | - | - | - | - | - | - | - | - | 6,500 |
| 1a.1.17.6 | Biological shield | - | - | - | - | - | - | 64 | 10 | 74 | 74 | - | - | - | - | - | - | - | - | - | 500 |
| 1a.1.17.7 | Steam generators | - | - | - | - | - | - | 401 | 60 | 461 | 461 | - | - | - | - | - | - | - | - | - | 3,120 |
| 1a.1.17.8 | Reinforced concrete | - | - | - | - | - | - | 206 | 31 | 236 | 118 | - | 118 | - | - | - | - | - | - | - | 1,600 |
| 1a.1.17.9 | Main Turbine | - | - | - | - | - | - | 51 | 8 | 59 | - | - | 59 | - | - | - | - | - | - | - | 400 |
| 1a.1.17.10 | Main Condensers | - | - | - | - | - | - | 51 | 8 | 59 | - | - | 59 | - | - | - | - | - | - | - | 400 |
| 1a.1.17.11 | Plant structures & buildings | - | - | - | - | - | - | 401 | 60 | 461 | 231 | - | 231 | - | - | - | - | - | - | - | 3,120 |
| 1a.1.17.12 | Waste management | - | - | - | - | - | - | 591 | 89 | 680 | 680 | - | - | - | - | - | - | - | - | - | 4,600 |
| 1a.1.17.13 | Facility & site closeout | - | - | - | - | - | - | 116 | 17 | 133 | 67 | - | 67 | - | - | - | - | - | - | - | 900 |
| 1a.1.17 | Total | - | - | - | - | - | - | 4,861 | 729 | 5,591 | 4,923 | - | 668 | - | - | - | - | - | - | - | 37,827 |
| Planning & Site Preparations | | | | | | | | | | | | | | | | | | | | | |
| 1a.1.18 | Prepare dismantling sequence | - | - | - | - | - | - | 308 | 46 | 355 | 355 | - | - | - | - | - | - | - | - | - | 2,400 |
| 1a.1.19 | Plant prep. & temp. svces | - | - | - | - | - | - | 3,500 | 525 | 4,025 | 4,025 | - | - | - | - | - | - | - | - | - | - |
| 1a.1.20 | Design water clean-up system | - | - | - | - | - | - | 180 | 27 | 207 | 207 | - | - | - | - | - | - | - | - | - | 1,400 |
| 1a.1.21 | Rigging/Cont. Cntrl Envlps/tooling/etc. | - | - | - | - | - | - | 2,400 | 360 | 2,760 | 2,760 | - | - | - | - | - | - | - | - | - | - |
| 1a.1.22 | Procure casks/liners & containers | - | - | - | - | - | - | 158 | 24 | 182 | 182 | - | - | - | - | - | - | - | - | - | 1,230 |
| 1a.1 | Subtotal Period 1a Activity Costs | - | - | - | - | - | - | 15,945 | 2,392 | 18,336 | 17,669 | - | 668 | - | - | - | - | - | - | - | 78,157 |
| Period 1a Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 1a.2.1 | Spent Fuel Pool Isolation | - | - | - | - | - | - | 12,675 | 1,901 | 14,576 | 14,576 | - | - | - | - | - | - | - | - | - | - |
| 1a.2 | Subtotal Period 1a Additional Costs | - | - | - | - | - | - | 12,675 | 1,901 | 14,576 | 14,576 | - | - | - | - | - | - | - | - | - | - |
| Period 1a Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 1a.3.1 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 1,249 | - | 1,249 | - | 1,249 | - | - | - | - | - | - | - | - | - |
| 1a.3 | Subtotal Period 1a Collateral Costs | - | - | - | - | - | - | 1,249 | - | 1,249 | - | 1,249 | - | - | - | - | - | - | - | - | - |
| Period 1a Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 1a.4.1 | Insurance | - | - | - | - | - | - | 1,660 | 166 | 1,826 | 1,826 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.2 | Property taxes | - | - | - | - | - | - | 3,623 | 362 | 3,985 | 3,985 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.3 | Health physics supplies | - | 614 | - | - | - | - | - | 153 | 767 | 767 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.4 | Heavy equipment rental | - | 753 | - | - | - | - | - | 113 | 866 | 866 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.5 | Disposal of DAW generated | - | - | 12 | 5 | - | 50 | - | 14 | 82 | 82 | - | - | 610 | - | - | - | - | 12,190 | 20 | - |
| 1a.4.6 | Plant energy budget | - | - | - | - | - | - | 1,621 | 243 | 1,864 | 1,864 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.7 | NRC Fees | - | - | - | - | - | - | 1,137 | 114 | 1,251 | 1,251 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.8 | Emergency Planning Fees | - | - | - | - | - | - | 2,174 | 217 | 2,392 | - | 2,392 | - | - | - | - | - | - | - | - | - |
| 1a.4.9 | Fixed Overhead | - | - | - | - | - | - | 1,440 | 216 | 1,656 | 1,656 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.10 | Spent Fuel Pool O&M | - | - | - | - | - | - | 422 | 63 | 486 | - | 486 | - | - | - | - | - | - | - | - | - |
| 1a.4.11 | ISFSI Operating Costs | - | - | - | - | - | - | 56 | 8 | 64 | - | 64 | - | - | - | - | - | - | - | - | - |
| 1a.4.12 | Railroad Track Maintenance | - | - | - | - | - | - | 63 | 9 | 72 | 72 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.13 | Security Staff Cost | - | - | - | - | - | - | 8,328 | 1,249 | 9,577 | 9,577 | - | - | - | - | - | - | - | - | - | 122,720 |
| 1a.4.14 | Utility Staff Cost | - | - | - | - | - | - | 26,931 | 4,040 | 30,971 | 30,971 | - | - | - | - | - | - | - | - | - | 422,240 |
| 1a.4 | Subtotal Period 1a Period-Dependent Costs | - | 1,367 | 12 | 5 | - | 50 | 47,456 | 6,970 | 55,860 | 52,918 | 2,942 | - | 610 | - | - | - | - | 12,190 | 20 | 544,960 |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table F-1
Prairie Island DECON Unit 1
DECON Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|--|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| 1a.0 | TOTAL PERIOD 1a COST | - | 1,367 | 12 | 5 | - | 50 | 77,325 | 11,263 | 90,022 | 85,163 | 4,191 | 668 | - | 610 | - | - | - | 12,190 | 20 | 623,117 |
| PERIOD 1b - Decommissioning Preparations | | | | | | | | | | | | | | | | | | | | | |
| Period 1b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| Detailed Work Procedures | | | | | | | | | | | | | | | | | | | | | |
| 1b.1.1.1 | Plant systems | - | - | - | - | - | - | 608 | 91 | 700 | 630 | - | 70 | - | - | - | - | - | - | - | 4,733 |
| 1b.1.1.2 | NSSS Decontamination Flush | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| 1b.1.1.3 | Reactor internals | - | - | - | - | - | - | 321 | 48 | 369 | 369 | - | - | - | - | - | - | - | - | - | 2,500 |
| 1b.1.1.4 | Remaining buildings | - | - | - | - | - | - | 174 | 26 | 200 | 50 | - | 150 | - | - | - | - | - | - | - | 1,350 |
| 1b.1.1.5 | CRD cooling assembly | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| 1b.1.1.6 | CRD housings & ICI tubes | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| 1b.1.1.7 | Incore instrumentation | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| 1b.1.1.8 | Reactor vessel | - | - | - | - | - | - | 467 | 70 | 537 | 537 | - | - | - | - | - | - | - | - | - | 3,630 |
| 1b.1.1.9 | Facility closeout | - | - | - | - | - | - | 154 | 23 | 177 | 89 | - | 89 | - | - | - | - | - | - | - | 1,200 |
| 1b.1.1.10 | Missile shields | - | - | - | - | - | - | 58 | 9 | 67 | 67 | - | - | - | - | - | - | - | - | - | 450 |
| 1b.1.1.11 | Biological shield | - | - | - | - | - | - | 154 | 23 | 177 | 177 | - | - | - | - | - | - | - | - | - | 1,200 |
| 1b.1.1.12 | Steam generators | - | - | - | - | - | - | 591 | 89 | 680 | 680 | - | - | - | - | - | - | - | - | - | 4,600 |
| 1b.1.1.13 | Reinforced concrete | - | - | - | - | - | - | 129 | 19 | 148 | 74 | - | 74 | - | - | - | - | - | - | - | 1,000 |
| 1b.1.1.14 | Main Turbine | - | - | - | - | - | - | 200 | 30 | 231 | - | - | 231 | - | - | - | - | - | - | - | 1,560 |
| 1b.1.1.15 | Main Condensers | - | - | - | - | - | - | 200 | 30 | 231 | - | - | 231 | - | - | - | - | - | - | - | 1,560 |
| 1b.1.1.16 | Auxiliary building | - | - | - | - | - | - | 351 | 53 | 403 | 363 | - | 40 | - | - | - | - | - | - | - | 2,730 |
| 1b.1.1.17 | Reactor building | - | - | - | - | - | - | 351 | 53 | 403 | 363 | - | 40 | - | - | - | - | - | - | - | 2,730 |
| 1b.1.1 | Total | - | - | - | - | - | - | 4,272 | 641 | 4,913 | 3,989 | - | 924 | - | - | - | - | - | - | - | 33,243 |
| 1b.1.2 | Decon primary loop | 572 | - | - | - | - | - | - | 286 | 859 | 859 | - | - | - | - | - | - | - | - | 1,067 | - |
| 1b.1 | Subtotal Period 1b Activity Costs | 572 | - | - | - | - | - | 4,272 | 927 | 5,772 | 4,848 | - | 924 | - | - | - | - | - | - | 1,067 | 33,243 |
| Period 1b Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 1b.2.1 | Site Characterization | - | - | - | - | - | - | 3,520 | 1,056 | 4,576 | 4,576 | - | - | - | - | - | - | - | - | 21,020 | 8,332 |
| 1b.2.2 | Mixed/Hazardous Waste | - | - | 353 | 94 | 178 | - | - | 76 | 702 | 702 | - | - | 6,132 | - | - | - | - | 351,977 | 2,348 | - |
| 1b.2.3 | Asbestos Abatement | - | 2,526 | 3 | 150 | - | 1,369 | - | 996 | 5,044 | 5,044 | - | - | - | 12,843 | - | - | - | 166,959 | 20,907 | - |
| 1b.2 | Subtotal Period 1b Additional Costs | - | 2,526 | 356 | 244 | 178 | 1,369 | 3,520 | 2,129 | 10,321 | 10,321 | - | - | 6,132 | 12,843 | - | - | - | 518,936 | 44,275 | 8,332 |
| Period 1b Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 1b.3.1 | Decon equipment | 1,055 | - | - | - | - | - | - | 158 | 1,213 | 1,213 | - | - | - | - | - | - | - | - | - | - |
| 1b.3.2 | DOC staff relocation expenses | - | - | - | - | - | - | 1,264 | 190 | 1,454 | 1,454 | - | - | - | - | - | - | - | - | - | - |
| 1b.3.3 | Process decommissioning water waste | 25 | - | 16 | 29 | - | 66 | - | 35 | 172 | 172 | - | - | 152 | - | - | - | - | 9,127 | 30 | - |
| 1b.3.4 | Process decommissioning chemical flush waste | 2 | - | 61 | 199 | - | 3,889 | - | 1,009 | 5,159 | 5,159 | - | - | - | 588 | - | - | - | 62,689 | 110 | - |
| 1b.3.5 | Small tool allowance | - | 36 | - | - | - | - | - | 5 | 42 | 42 | - | - | - | - | - | - | - | - | - | - |
| 1b.3.6 | Pipe cutting equipment | - | 1,200 | - | - | - | - | - | 180 | 1,380 | 1,380 | - | - | - | - | - | - | - | - | - | - |
| 1b.3.7 | Decon rig | 2,104 | - | - | - | - | - | - | 316 | 2,419 | 2,419 | - | - | - | - | - | - | - | - | - | - |
| 1b.3.8 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 163 | 25 | 188 | - | 188 | - | - | - | - | - | - | - | - | - |
| 1b.3.9 | Retention and Severance | - | - | - | - | - | - | 1,032 | 155 | 1,187 | 1,187 | - | - | - | - | - | - | - | - | - | - |
| 1b.3.10 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 623 | - | 623 | - | 623 | - | - | - | - | - | - | - | - | - |
| 1b.3 | Subtotal Period 1b Collateral Costs | 3,185 | 1,236 | 77 | 228 | - | 3,955 | 3,082 | 2,072 | 13,836 | 13,025 | 811 | - | 152 | 588 | - | - | - | 71,815 | 140 | - |
| Period 1b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 1b.4.1 | Decon supplies | 38 | - | - | - | - | - | - | 9 | 47 | 47 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.2 | Insurance | - | - | - | - | - | - | 828 | 83 | 910 | 910 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.3 | Property taxes | - | - | - | - | - | - | 1,806 | 181 | 1,987 | 1,987 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.4 | Health physics supplies | - | 475 | - | - | - | - | - | 119 | 594 | 594 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.5 | Heavy equipment rental | - | 375 | - | - | - | - | - | 56 | 432 | 432 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.6 | Disposal of DAW generated | - | - | 7 | 3 | - | 29 | - | 8 | 48 | 48 | - | - | 356 | - | - | - | - | 7,122 | 12 | - |
| 1b.4.7 | Plant energy budget | - | - | - | - | - | - | 1,617 | 243 | 1,859 | 1,859 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.8 | NRC Fees | - | - | - | - | - | - | 323 | 32 | 355 | 355 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.9 | Emergency Planning Fees | - | - | - | - | - | - | 1,084 | 108 | 1,193 | - | 1,193 | - | - | - | - | - | - | - | - | - |
| 1b.4.10 | Fixed Overhead | - | - | - | - | - | - | 718 | 108 | 826 | 826 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.11 | Spent Fuel Pool O&M | - | - | - | - | - | - | 211 | 32 | 242 | - | 242 | - | - | - | - | - | - | - | - | - |
| 1b.4.12 | ISFSI Operating Costs | - | - | - | - | - | - | 28 | 4 | 32 | - | 32 | - | - | - | - | - | - | - | - | - |
| 1b.4.13 | Railroad Track Maintenance | - | - | - | - | - | - | 31 | 5 | 36 | 36 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.14 | Security Staff Cost | - | - | - | - | - | - | 4,153 | 623 | 4,775 | 4,775 | - | - | - | - | - | - | - | - | - | 61,192 |
| 1b.4.15 | DOC Staff Cost | - | - | - | - | - | - | 5,846 | 877 | 6,723 | 6,723 | - | - | - | - | - | - | - | - | - | 63,266 |
| 1b.4.16 | Utility Staff Cost | - | - | - | - | - | - | 13,505 | 2,026 | 15,531 | 15,531 | - | - | - | - | - | - | - | - | - | 211,579 |
| 1b.4 | Subtotal Period 1b Period-Dependent Costs | 38 | 851 | 7 | 3 | - | 29 | 30,149 | 4,513 | 35,590 | 34,123 | 1,467 | - | 356 | - | - | - | - | 7,122 | 12 | 336,037 |
| 1b.0 | TOTAL PERIOD 1b COST | 3,795 | 4,613 | 440 | 475 | 178 | 5,354 | 41,023 | 9,641 | 65,519 | 62,317 | 2,278 | 924 | 6,132 | 13,351 | 588 | - | - | 597,873 | 45,493 | 377,612 |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table F-1
Prairie Island DECON Unit 1
DECON Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|--|--|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| PERIOD 1 TOTALS | | 3,795 | 5,980 | 452 | 480 | 178 | 5,404 | 118,348 | 20,903 | 155,540 | 147,480 | 6,468 | 1,592 | 6,132 | 13,961 | 588 | - | - | 610,063 | 45,513 | 1,000,729 |
| PERIOD 2a - Large Component Removal | | | | | | | | | | | | | | | | | | | | | |
| Period 2a Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| Nuclear Steam Supply System Removal | | | | | | | | | | | | | | | | | | | | | |
| 2a.1.1.1 | Reactor Coolant Piping | 54 | 47 | 10 | 18 | - | 187 | - | 89 | 406 | 406 | - | - | - | 508 | - | - | - | 35,411 | 1,421 | - |
| 2a.1.1.2 | Pressurizer Relief Tank | 24 | 21 | 6 | 12 | - | 125 | - | 51 | 238 | 238 | - | - | - | 338 | - | - | - | 23,594 | 630 | - |
| 2a.1.1.3 | Reactor Coolant Pumps & Motors | 57 | 68 | 110 | 93 | - | 463 | - | 186 | 977 | 977 | - | - | - | 2,332 | - | - | - | 295,800 | 2,049 | 100 |
| 2a.1.1.4 | Pressurizer | - | 77 | 503 | 97 | - | 776 | - | 278 | 1,732 | 1,732 | - | - | - | 2,196 | - | - | - | 185,015 | 1,666 | 938 |
| 2a.1.1.5 | Steam Generators | - | 3,307 | 2,269 | 1,770 | 2,409 | 4,001 | - | 2,681 | 16,437 | 16,437 | - | - | 18,672 | 11,316 | - | - | - | 1,689,435 | 11,613 | 2,875 |
| 2a.1.1.6 | CRDMs/ICIs/Service Structure Removal | 302 | 281 | 218 | 66 | - | 938 | - | 488 | 2,294 | 2,294 | - | - | - | 4,797 | - | - | - | 177,400 | 8,104 | - |
| 2a.1.1.7 | Reactor Vessel Internals | 82 | 4,861 | 13,621 | 929 | - | 9,015 | 307 | 11,878 | 40,693 | 40,693 | - | - | - | 501 | 125 | 673 | - | 164,987 | 25,123 | 1,163 |
| 2a.1.1.8 | Reactor Vessel | 94 | 6,046 | 2,028 | 728 | - | 2,975 | 307 | 6,804 | 18,982 | 18,982 | - | - | - | 8,073 | - | - | - | 576,524 | 25,123 | 1,163 |
| 2a.1.1 | Totals | 613 | 14,709 | 18,764 | 3,714 | 2,409 | 18,480 | 614 | 22,455 | 81,759 | 81,759 | - | - | 18,672 | 30,062 | 125 | 673 | - | 3,148,166 | 75,729 | 6,240 |
| Removal of Major Equipment | | | | | | | | | | | | | | | | | | | | | |
| 2a.1.2 | Main Turbine/Generator | - | 331 | 172 | 64 | 527 | 377 | - | 283 | 1,752 | 1,752 | - | - | 2,131 | 1,187 | - | - | - | 203,265 | 4,667 | - |
| 2a.1.3 | Main Condensers | - | 2,801 | 109 | 62 | 705 | 533 | - | 960 | 5,170 | 5,170 | - | - | 3,800 | 1,587 | - | - | - | 271,824 | 39,151 | - |
| Cascading Costs from Clean Building Demolition | | | | | | | | | | | | | | | | | | | | | |
| 2a.1.4.1 | Reactor | - | 794 | - | - | - | - | - | 119 | 913 | 913 | - | - | - | - | - | - | - | - | 7,589 | - |
| 2a.1.4 | Totals | - | 794 | - | - | - | - | - | 119 | 913 | 913 | - | - | - | - | - | - | - | - | 7,589 | - |
| Disposal of Plant Systems | | | | | | | | | | | | | | | | | | | | | |
| 2a.1.5.1 | Air Removal | - | 31 | - | - | - | - | - | 5 | 36 | - | - | 36 | - | - | - | - | - | - | 452 | - |
| 2a.1.5.2 | Auxiliary Feedwater | - | 46 | - | - | - | - | - | 7 | 53 | - | - | 53 | - | - | - | - | - | - | 670 | - |
| 2a.1.5.3 | Auxiliary Feedwater - RCA | - | 47 | 0 | 2 | 36 | - | - | 17 | 102 | 102 | - | - | 215 | - | - | - | - | 8,722 | 601 | - |
| 2a.1.5.4 | Bleed Steam | - | 90 | - | - | - | - | - | 14 | 104 | - | - | 104 | - | - | - | - | - | - | 1,335 | - |
| 2a.1.5.5 | Caustic Addition - RCA | - | 38 | 0 | 2 | 39 | - | - | 16 | 95 | 95 | - | - | 233 | - | - | - | - | 9,453 | 444 | - |
| 2a.1.5.6 | Chemical Feed | - | 20 | - | - | - | - | - | 3 | 23 | - | - | 23 | - | - | - | - | - | - | 304 | - |
| 2a.1.5.7 | Chemical Feed - RCA | - | 1 | 0 | 0 | 1 | - | - | 0 | 3 | 3 | - | - | 6 | - | - | - | - | 243 | 12 | - |
| 2a.1.5.8 | Circulating Water | - | 42 | - | - | - | - | - | 6 | 49 | - | - | 49 | - | - | - | - | - | - | 619 | - |
| 2a.1.5.9 | Condensate | - | 474 | - | - | - | - | - | 71 | 545 | - | - | 545 | - | - | - | - | - | - | 6,837 | - |
| 2a.1.5.10 | Condensate Polishing | - | 235 | - | - | - | - | - | 35 | 271 | - | - | 271 | - | - | - | - | - | - | 3,420 | - |
| 2a.1.5.11 | Condensate Polishing - RCA | - | 183 | 4 | 15 | 348 | - | - | 101 | 651 | 651 | - | - | 2,078 | - | - | - | - | 84,395 | 2,329 | - |
| 2a.1.5.12 | Electro-hydraulic | - | 9 | - | - | - | - | - | 1 | 10 | - | - | 10 | - | - | - | - | - | - | 127 | - |
| 2a.1.5.13 | Feedwater | - | 153 | - | - | - | - | - | 23 | 175 | - | - | 175 | - | - | - | - | - | - | 2,215 | - |
| 2a.1.5.14 | Feedwater - RCA | - | 195 | 7 | 24 | 537 | - | - | 133 | 895 | 895 | - | - | 3,208 | - | - | - | - | 130,294 | 2,651 | - |
| 2a.1.5.15 | Gland Seal | - | 34 | - | - | - | - | - | 5 | 39 | - | - | 39 | - | - | - | - | - | - | 505 | - |
| 2a.1.5.16 | Heater Drain | - | 400 | - | - | - | - | - | 60 | 460 | - | - | 460 | - | - | - | - | - | - | 5,881 | - |
| 2a.1.5.17 | Internal Circ Water & CDSR | - | 27 | - | - | - | - | - | 4 | 31 | - | - | 31 | - | - | - | - | - | - | 389 | - |
| 2a.1.5.18 | Main Gen/Exciter/Transformer | - | 0 | - | - | - | - | - | 0 | 0 | - | - | 0 | - | - | - | - | - | - | 5 | - |
| 2a.1.5.19 | Main Steam | - | 115 | - | - | - | - | - | 17 | 133 | - | - | 133 | - | - | - | - | - | - | 1,690 | - |
| 2a.1.5.20 | Main Steam - RCA | - | 366 | 10 | 37 | 844 | - | - | 225 | 1,482 | 1,482 | - | - | 5,044 | - | - | - | - | 204,825 | 4,956 | - |
| 2a.1.5.21 | Steam Generator Blowdown | - | 478 | 22 | 29 | 340 | 234 | - | 235 | 1,337 | 1,337 | - | - | 2,031 | 686 | - | - | - | 126,640 | 6,667 | - |
| 2a.1.5.22 | Steam Generators | - | 5 | - | - | - | - | - | 1 | 6 | - | - | 6 | - | - | - | - | - | - | 75 | - |
| 2a.1.5.23 | Turbine & Moisture Separators | - | 386 | - | - | - | - | - | 58 | 444 | - | - | 444 | - | - | - | - | - | - | 5,609 | - |
| 2a.1.5.24 | Turbine Oil Purification | - | 70 | - | - | - | - | - | 11 | 81 | - | - | 81 | - | - | - | - | - | - | 1,003 | - |
| 2a.1.5 | Totals | - | 3,445 | 44 | 108 | 2,144 | 234 | - | 1,048 | 7,023 | 4,565 | - | 2,458 | 12,815 | 686 | - | - | - | 564,572 | 48,794 | - |
| 2a.1.6 | Scaffolding in support of decommissioning | - | 930 | 3 | 1 | 26 | 4 | - | 238 | 1,202 | 1,202 | - | - | 138 | 12 | - | - | - | 6,985 | 6,368 | - |
| 2a.1 | Subtotal Period 2a Activity Costs | 613 | 23,011 | 19,092 | 3,950 | 5,810 | 19,628 | 614 | 25,102 | 97,819 | 95,362 | - | 2,458 | 37,556 | 33,533 | 125 | 673 | - | 4,194,811 | 182,298 | 6,240 |
| Period 2a Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 2a.2.1 | Retired RPV Upper Internals Package | - | 257 | 387 | 217 | - | 1,394 | - | 1,041 | 3,296 | 3,296 | - | - | - | 376 | 112 | - | - | 50,164 | 3,333 | 133 |
| 2a.2 | Subtotal Period 2a Additional Costs | - | 257 | 387 | 217 | - | 1,394 | - | 1,041 | 3,296 | 3,296 | - | - | - | 376 | 112 | - | - | 50,164 | 3,333 | 133 |
| Period 2a Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 2a.3.1 | Process decommissioning water waste | 48 | - | 32 | 58 | - | 130 | - | 68 | 337 | 337 | - | - | - | 299 | - | - | - | 17,968 | 58 | - |
| 2a.3.2 | Process decommissioning chemical flush waste | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 2a.3.3 | Small tool allowance | - | 239 | - | - | - | - | - | 36 | 274 | 247 | - | 27 | - | - | - | - | - | - | - | - |
| 2a.3.4 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 1,639 | 246 | 1,885 | - | 1,885 | - | - | - | - | - | - | - | - | - |
| 2a.3.5 | Retention and Severance | - | - | - | - | - | - | 12,780 | 1,917 | 14,697 | 14,697 | - | - | - | - | - | - | - | - | - | - |
| 2a.3.6 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 1,780 | - | 1,780 | - | 1,780 | - | - | - | - | - | - | - | - | - |
| 2a.3 | Subtotal Period 2a Collateral Costs | 48 | 239 | 32 | 58 | - | 130 | 16,198 | 2,267 | 18,972 | 15,281 | 3,664 | 27 | - | 299 | - | - | - | 17,968 | 58 | - |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table F-1
Prairie Island DECON Unit 1
DECON Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| Period 2a Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 2a.4.1 | Decon supplies | 107 | - | - | - | - | - | - | 27 | 134 | 134 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.2 | Insurance | - | - | - | - | - | - | 690 | 69 | 759 | 759 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.3 | Property taxes | - | - | - | - | - | - | 5,009 | 501 | 5,510 | 5,510 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.4 | Health physics supplies | - | 1,950 | - | - | - | - | - | 487 | 2,437 | 2,437 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.5 | Heavy equipment rental | - | 3,565 | - | - | - | - | - | 535 | 4,100 | 4,100 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.6 | Disposal of DAW generated | - | - | 73 | 30 | - | 303 | - | 88 | 493 | 493 | - | - | - | 3,681 | - | - | - | 73,619 | 120 | - |
| 2a.4.7 | Plant energy budget | - | - | - | - | - | - | 2,194 | 329 | 2,523 | 2,523 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.8 | NRC Fees | - | - | - | - | - | - | 842 | 84 | 926 | 926 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.9 | Emergency Planning Fees | - | - | - | - | - | - | 2,647 | 265 | 2,912 | - | 2,912 | - | - | - | - | - | - | - | - | - |
| 2a.4.10 | Fixed Overhead | - | - | - | - | - | - | 1,695 | 254 | 1,949 | 1,949 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.11 | Spent Fuel Pool O&M | - | - | - | - | - | - | 602 | 90 | 692 | - | 692 | - | - | - | - | - | - | - | - | - |
| 2a.4.12 | ISFSI Operating Costs | - | - | - | - | - | - | 80 | 12 | 92 | - | 92 | - | - | - | - | - | - | - | - | - |
| 2a.4.13 | Railroad Track Maintenance | - | - | - | - | - | - | 318 | 48 | 366 | 366 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.14 | Remedial Actions Surveys | - | - | - | - | - | - | 1,596 | 239 | 1,835 | 1,835 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.15 | Security Staff Cost | - | - | - | - | - | - | 11,727 | 1,759 | 13,486 | 13,486 | - | - | - | - | - | - | - | - | - | 172,726 |
| 2a.4.16 | DOC Staff Cost | - | - | - | - | - | - | 20,663 | 3,099 | 23,763 | 23,763 | - | - | - | - | - | - | - | - | - | 225,210 |
| 2a.4.17 | Utility Staff Cost | - | - | - | - | - | - | 26,905 | 4,036 | 30,941 | 30,941 | - | - | - | - | - | - | - | - | - | 417,453 |
| 2a.4 | Subtotal Period 2a Period-Dependent Costs | 107 | 5,515 | 73 | 30 | - | 303 | 74,968 | 11,922 | 92,918 | 89,223 | 3,696 | - | - | 3,681 | - | - | - | 73,619 | 120 | 815,389 |
| 2a.0 | TOTAL PERIOD 2a COST | 768 | 29,021 | 19,584 | 4,254 | 5,810 | 21,456 | 91,780 | 40,333 | 213,006 | 203,161 | 7,360 | 2,485 | 37,556 | 37,889 | 237 | 673 | - | 4,336,562 | 185,810 | 821,762 |
| PERIOD 2b - Site Decontamination | | | | | | | | | | | | | | | | | | | | | |
| Period 2b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| Disposal of Plant Systems | | | | | | | | | | | | | | | | | | | | | |
| 2b.1.1.1 | Aux Bldg Normal Ventilation | - | 2 | 0 | 0 | 1 | - | - | 1 | 3 | 3 | - | - | 3 | - | - | - | - | 140 | 29 | - |
| 2b.1.1.3 | Buildings Maintenance | - | 5 | - | - | - | - | - | 1 | 5 | - | - | 5 | - | - | - | - | - | - | 65 | - |
| 2b.1.1.4 | Chemical & Volume Control | 1,120 | 1,389 | 89 | 90 | 753 | 973 | - | 1,286 | 5,700 | 5,700 | - | - | 4,498 | 2,846 | - | - | - | 366,565 | 34,533 | - |
| 2b.1.1.5 | Component Cooling - RCA | - | 858 | 25 | 91 | 2,079 | - | - | 543 | 3,597 | 3,597 | - | - | 12,427 | - | - | - | - | 504,675 | 11,242 | - |
| 2b.1.1.6 | Containment Cooling | - | 74 | - | - | - | - | - | 11 | 85 | - | - | 85 | - | - | - | - | - | - | 1,086 | - |
| 2b.1.1.7 | Containment Cooling - RCA | - | 304 | 7 | 25 | 569 | - | - | 166 | 1,070 | 1,070 | - | - | 3,400 | - | - | - | - | 138,090 | 3,971 | - |
| 2b.1.1.8 | Containment Hydrogen Control - RCA | - | 30 | 0 | 1 | 18 | - | - | 10 | 59 | 59 | - | - | 105 | - | - | - | - | 4,278 | 401 | - |
| 2b.1.1.9 | Containment Spray - RCA | - | 93 | 2 | 6 | 145 | - | - | 46 | 293 | 293 | - | - | 868 | - | - | - | - | 35,249 | 1,217 | - |
| 2b.1.1.10 | Containment Ventilation | - | 255 | 24 | 51 | 828 | 248 | - | 260 | 1,667 | 1,667 | - | - | 4,951 | 737 | - | - | - | 247,952 | 3,668 | - |
| 2b.1.1.11 | Cooling Water | - | 163 | - | - | - | - | - | 24 | 187 | - | - | 187 | - | - | - | - | - | - | 2,396 | - |
| 2b.1.1.12 | Cooling Water - RCA | - | 658 | 16 | 57 | 1,293 | - | - | 368 | 2,392 | 2,392 | - | - | 7,728 | - | - | - | - | 313,832 | 8,594 | - |
| 2b.1.1.13 | D1 Emergency Diesel | - | 50 | - | - | - | - | - | 8 | 58 | - | - | 58 | - | - | - | - | - | - | 730 | - |
| 2b.1.1.14 | D2 Emergency Diesel | - | 36 | - | - | - | - | - | 5 | 41 | - | - | 41 | - | - | - | - | - | - | 522 | - |
| 2b.1.1.15 | Diesel Rooms Ventilation | - | 9 | - | - | - | - | - | 1 | 11 | - | - | 11 | - | - | - | - | - | - | 135 | - |
| 2b.1.1.16 | Electrical - Clean | - | 1,905 | - | - | - | - | - | 286 | 2,191 | - | - | 2,191 | - | - | - | - | - | - | 26,981 | - |
| 2b.1.1.17 | Electrical - Contaminated | - | 611 | 7 | 20 | 423 | 32 | - | 228 | 1,321 | 1,321 | - | - | 2,527 | 95 | - | - | - | 108,690 | 8,377 | - |
| 2b.1.1.18 | Electrical - Decontaminated | - | 3,787 | 48 | 173 | 3,940 | - | - | 1,569 | 9,518 | 9,518 | - | - | 23,551 | - | - | - | - | 956,401 | 49,378 | - |
| 2b.1.1.19 | Fuel Handling | - | 121 | 6 | 11 | 152 | 73 | - | 74 | 436 | 436 | - | - | 908 | 218 | - | - | - | 50,723 | 1,784 | - |
| 2b.1.1.20 | Fuel Oil | - | 121 | - | - | - | - | - | 18 | 140 | - | - | 140 | - | - | - | - | - | - | 1,697 | - |
| 2b.1.1.21 | HVAC - Clean | - | 120 | - | - | - | - | - | 18 | 138 | - | - | 138 | - | - | - | - | - | - | 1,891 | - |
| 2b.1.1.22 | HVAC - Contaminated | - | 374 | 9 | 26 | 546 | 41 | - | 190 | 1,186 | 1,186 | - | - | 3,261 | 123 | - | - | - | 140,257 | 5,032 | - |
| 2b.1.1.23 | Incore Instrumentation | 0 | 28 | 1 | 2 | 10 | 19 | - | 14 | 74 | 74 | - | - | 60 | 57 | - | - | - | 6,058 | 425 | - |
| 2b.1.1.24 | Misc Drains & Vents | - | 233 | 15 | 13 | 65 | 176 | - | 115 | 618 | 618 | - | - | 390 | 514 | - | - | - | 49,062 | 3,091 | - |
| 2b.1.1.25 | Reactor Coolant | 153 | 311 | 21 | 18 | 58 | 265 | - | 234 | 1,060 | 1,060 | - | - | 344 | 777 | - | - | - | 64,085 | 6,470 | - |
| 2b.1.1.26 | Reactor Hot Sampling | 149 | 136 | 12 | 7 | 11 | 118 | - | 142 | 576 | 576 | - | - | 66 | 342 | - | - | - | 25,063 | 3,946 | - |
| 2b.1.1.27 | Reactor Makeup | - | 73 | - | - | - | - | - | 11 | 84 | - | - | 84 | - | - | - | - | - | - | 1,042 | - |
| 2b.1.1.28 | Reactor Vessel | 9 | 21 | 1 | 0 | 4 | 5 | - | 12 | 52 | 52 | - | - | 26 | 14 | - | - | - | 2,000 | 425 | - |
| 2b.1.1.29 | Residual Heat Removal | 357 | 419 | 85 | 86 | 484 | 1,105 | - | 654 | 3,190 | 3,190 | - | - | 2,895 | 3,252 | - | - | - | 326,425 | 7,621 | - |
| 2b.1.1.30 | Safeguards Chilled Water | - | 18 | - | - | - | - | - | 3 | 20 | - | - | 20 | - | - | - | - | - | - | 259 | - |
| 2b.1.1.31 | Safety Injection | - | 893 | 42 | 73 | 1,136 | 393 | - | 507 | 3,044 | 3,044 | - | - | 6,788 | 1,156 | - | - | - | 349,908 | 12,561 | - |
| 2b.1.1.32 | Sampling | - | 60 | 4 | 3 | 10 | 37 | - | 26 | 140 | 140 | - | - | 59 | 107 | - | - | - | 9,420 | 811 | - |
| 2b.1.1.33 | Shield Bldg Ventilation | - | 140 | 14 | 26 | 360 | 165 | - | 135 | 839 | 839 | - | - | 2,152 | 491 | - | - | - | 118,583 | 2,030 | - |
| 2b.1.1.34 | Station & Instrument Air | - | 20 | - | - | - | - | - | 3 | 23 | - | - | 23 | - | - | - | - | - | - | 300 | - |
| 2b.1.1.35 | Station & Instrument Air - RCA | - | 81 | 1 | 2 | 56 | - | - | 29 | 169 | 169 | - | - | 332 | - | - | - | - | 13,496 | 1,053 | - |
| 2b.1.1.36 | Turbine Bldg Traps & Drains | - | 50 | - | - | - | - | - | 8 | 58 | - | - | 58 | - | - | - | - | - | - | 767 | - |
| 2b.1.1.37 | Unit Coolers | - | 42 | - | - | - | - | - | 6 | 49 | - | - | 49 | - | - | - | - | - | - | 611 | - |
| 2b.1.1.38 | Unit Coolers - RCA | - | 55 | 0 | 2 | 39 | - | - | 20 | 115 | 115 | - | - | 230 | - | - | - | - | 9,348 | 683 | - |
| 2b.1.1 | Totals | 1,789 | 13,544 | 429 | 786 | 12,979 | 3,651 | - | 7,032 | 40,209 | 37,119 | - | 3,091 | 77,571 | 10,728 | - | - | - | 3,840,299 | 205,829 | - |
| 2b.1.2 | Scaffolding in support of decommissioning | - | 1,163 | 4 | 2 | 32 | 5 | - | 297 | 1,503 | 1,503 | - | - | 173 | 15 | - | - | - | 8,731 | 7,960 | - |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table F-1
Prairie Island DECON Unit 1
DECON Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|--|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|---------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| Decontamination of Site Buildings | | | | | | | | | | | | | | | | | | | | | | |
| 2b.1.3.1 | Reactor | 1,215 | 2,807 | 240 | 1,236 | 373 | 13,624 | - | 4,981 | 24,476 | 24,476 | - | - | 2,230 | 83,429 | - | - | - | - | 3,633,417 | 50,950 | - |
| 2b.1.3.2 | Backwash Waste Receiving Tank | - | 28 | 3 | 17 | - | 97 | - | 34 | 179 | 179 | - | - | - | 929 | - | - | - | - | 43,896 | 301 | - |
| 2b.1.3 | Totals | 1,215 | 2,835 | 243 | 1,253 | 373 | 13,721 | - | 5,015 | 24,655 | 24,655 | - | - | 2,230 | 84,358 | - | - | - | - | 3,677,313 | 51,251 | - |
| 2b.1.4 | Prepare/submit License Termination Plan | - | - | - | - | - | - | 526 | 79 | 605 | 605 | - | - | - | - | - | - | - | - | - | - | 4,096 |
| 2b.1.5 | Receive NRC approval of termination plan | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - | - |
| 2b.1 | Subtotal Period 2b Activity Costs | 3,004 | 17,542 | 675 | 2,041 | 13,384 | 17,377 | 526 | 12,423 | 66,973 | 63,882 | - | 3,091 | 79,974 | 95,101 | - | - | - | - | 7,526,343 | 265,040 | 4,096 |
| Period 2b Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 2b.2.1 | Operational Equipment | - | - | 11 | 36 | 606 | - | - | 97 | 751 | 751 | - | - | 5,880 | - | - | - | - | - | 147,000 | 16 | - |
| 2b.2.2 | Excavation of Underground Services | - | 1,175 | - | - | - | - | 225 | 328 | 1,728 | 1,728 | - | - | - | - | - | - | - | - | - | 7,411 | - |
| 2b.2.3 | Security Modifications | - | - | - | - | - | - | 4,348 | 652 | 5,000 | 5,000 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.2 | Subtotal Period 2b Additional Costs | - | 1,175 | 11 | 36 | 606 | - | 4,573 | 1,077 | 7,478 | 7,478 | - | - | 5,880 | - | - | - | - | - | 147,000 | 7,427 | - |
| Period 2b Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 2b.3.1 | Process decommissioning water waste | 108 | - | 74 | 132 | - | 298 | - | 156 | 768 | 768 | - | - | - | 684 | - | - | - | - | 41,053 | 133 | - |
| 2b.3.2 | Process decommissioning chemical flush waste | 2 | - | 90 | 296 | - | 677 | - | 224 | 1,289 | 1,289 | - | - | - | 875 | - | - | - | - | 93,252 | 164 | - |
| 2b.3.3 | Small tool allowance | - | 315 | - | - | - | - | - | 47 | 362 | 362 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.3.4 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 10,782 | 1,617 | 12,400 | - | 12,400 | - | - | - | - | - | - | - | - | - | - |
| 2b.3.5 | Retention and Severance | - | - | - | - | - | - | 6,141 | 921 | 7,063 | 7,063 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.3.6 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 1,348 | - | 1,348 | - | 1,348 | - | - | - | - | - | - | - | - | - | - |
| 2b.3 | Subtotal Period 2b Collateral Costs | 110 | 315 | 164 | 428 | - | 975 | 18,272 | 2,965 | 23,230 | 9,482 | 13,748 | - | - | 1,559 | - | - | - | - | 134,305 | 297 | - |
| Period 2b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 2b.4.1 | Decon supplies | 511 | - | - | - | - | - | - | 128 | 639 | 639 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.2 | Insurance | - | - | - | - | - | - | 523 | 52 | 575 | 575 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.3 | Property taxes | - | - | - | - | - | - | 3,435 | 344 | 3,779 | 3,779 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.4 | Health physics supplies | - | 2,140 | - | - | - | - | - | 535 | 2,675 | 2,675 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.5 | Heavy equipment rental | - | 2,774 | - | - | - | - | - | 416 | 3,190 | 3,190 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.6 | Disposal of DAW generated | - | - | 70 | 28 | - | 290 | - | 84 | 472 | 472 | - | - | - | 3,521 | - | - | - | - | 70,425 | 115 | - |
| 2b.4.7 | Plant energy budget | - | - | - | - | - | - | 1,313 | 197 | 1,509 | 1,509 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.8 | NRC Fees | - | - | - | - | - | - | 638 | 64 | 701 | 701 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.9 | Emergency Planning Fees | - | - | - | - | - | - | 2,006 | 201 | 2,207 | - | 2,207 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.10 | Fixed Overhead | - | - | - | - | - | - | 1,284 | 193 | 1,477 | 1,477 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.11 | Spent Fuel Pool O&M | - | - | - | - | - | - | 456 | 68 | 524 | - | 524 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.12 | Liquid Radwaste Processing Equipment/Services | - | - | - | - | - | - | 229 | 34 | 264 | 264 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.13 | ISFSI Operating Costs | - | - | - | - | - | - | 60 | 9 | 69 | - | 69 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.14 | Railroad Track Maintenance | - | - | - | - | - | - | 67 | 10 | 78 | 78 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.15 | Remedial Actions Surveys | - | - | - | - | - | - | 1,209 | 181 | 1,391 | 1,391 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.16 | Security Staff Cost | - | - | - | - | - | - | 8,259 | 1,239 | 9,497 | 9,497 | - | - | - | - | - | - | - | - | - | - | 121,244 |
| 2b.4.17 | DOC Staff Cost | - | - | - | - | - | - | 10,738 | 1,611 | 12,348 | 12,348 | - | - | - | - | - | - | - | - | - | - | 121,244 |
| 2b.4.18 | Utility Staff Cost | - | - | - | - | - | - | 13,928 | 2,089 | 16,017 | 16,017 | - | - | - | - | - | - | - | - | - | - | 225,649 |
| 2b.4 | Subtotal Period 2b Period-Dependent Costs | 511 | 4,914 | 70 | 28 | - | 290 | 44,145 | 7,454 | 57,412 | 54,612 | 2,800 | - | - | 3,521 | - | - | - | - | 70,425 | 115 | 468,137 |
| 2b.0 | TOTAL PERIOD 2b COST | 3,626 | 23,946 | 920 | 2,533 | 13,990 | 18,642 | 67,516 | 23,920 | 155,093 | 135,455 | 16,548 | 3,091 | 85,854 | 100,182 | - | - | - | - | 7,878,073 | 272,879 | 472,233 |
| PERIOD 2c - Spent fuel delay prior to SFP decon | | | | | | | | | | | | | | | | | | | | | | |
| Period 2c Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Period 2c Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 2c.3.1 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 53,816 | 8,072 | 61,889 | - | 61,889 | - | - | - | - | - | - | - | - | - | - |
| 2c.3.2 | Retention and Severance | - | - | - | - | - | - | 3,512 | 527 | 4,039 | 4,039 | - | - | - | - | - | - | - | - | - | - | - |
| 2c.3.3 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 1,526 | - | 1,526 | - | 1,526 | - | - | - | - | - | - | - | - | - | - |
| 2c.3 | Subtotal Period 2c Collateral Costs | - | - | - | - | - | - | 58,855 | 8,599 | 67,455 | 4,039 | 63,415 | - | - | - | - | - | - | - | - | - | - |
| Period 2c Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 2c.4.1 | Insurance | - | - | - | - | - | - | 592 | 59 | 651 | 651 | - | - | - | - | - | - | - | - | - | - | - |
| 2c.4.2 | Property taxes | - | - | - | - | - | - | 3,512 | 351 | 3,863 | 3,863 | - | - | - | - | - | - | - | - | - | - | - |
| 2c.4.3 | Health physics supplies | - | 263 | - | - | - | - | - | 66 | 328 | 328 | - | - | - | - | - | - | - | - | - | - | - |
| 2c.4.4 | Disposal of DAW generated | - | - | 9 | 4 | - | 38 | - | 11 | 61 | 61 | - | - | - | 457 | - | - | - | - | 9,141 | 15 | - |
| 2c.4.5 | Plant energy budget | - | - | - | - | - | - | 1,486 | 223 | 1,709 | 1,709 | - | - | - | - | - | - | - | - | - | - | - |
| 2c.4.6 | NRC Fees | - | - | - | - | - | - | 687 | 69 | 756 | 756 | - | - | - | - | - | - | - | - | - | - | - |
| 2c.4.7 | Emergency Planning Fees | - | - | - | - | - | - | 2,271 | 227 | 2,498 | - | 2,498 | - | - | - | - | - | - | - | - | - | - |
| 2c.4.8 | Fixed Overhead | - | - | - | - | - | - | 1,454 | 218 | 1,672 | 1,672 | - | - | - | - | - | - | - | - | - | - | - |
| 2c.4.9 | Spent Fuel Pool O&M | - | - | - | - | - | - | 516 | 77 | 593 | - | 593 | - | - | - | - | - | - | - | - | - | - |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table F-1
Prairie Island DECON Unit 1
DECON Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| Period 2c Period-Dependent Costs (continued) | | | | | | | | | | | | | | | | | | | | | |
| 2c.4.10 | Liquid Radwaste Processing Equipment/Services | - | - | - | - | - | - | 260 | 39 | 298 | 298 | - | - | - | - | - | - | - | - | - | - |
| 2c.4.11 | ISFSI Operating Costs | - | - | - | - | - | - | 68 | 10 | 79 | - | 79 | - | - | - | - | - | - | - | - | - |
| 2c.4.12 | Railroad Track Maintenance | - | - | - | - | - | - | 76 | 11 | 88 | 88 | - | - | - | - | - | - | - | - | - | - |
| 2c.4.13 | Security Staff Cost | - | - | - | - | - | - | 9,348 | 1,402 | 10,751 | 10,751 | - | - | - | - | - | - | - | - | - | 137,246 |
| 2c.4.14 | Utility Staff Cost | - | - | - | - | - | - | 1,195 | 179 | 1,375 | 1,375 | - | - | - | - | - | - | - | - | - | 19,062 |
| 2c.4 | Subtotal Period 2c Period-Dependent Costs | - | 263 | 9 | 4 | - | 38 | 21,465 | 2,943 | 24,721 | 21,552 | 3,170 | - | - | 457 | - | - | - | 9,141 | 15 | 156,308 |
| 2c.0 | TOTAL PERIOD 2c COST | - | 263 | 9 | 4 | - | 38 | 80,320 | 11,543 | 92,176 | 25,591 | 66,585 | - | - | 457 | - | - | - | 9,141 | 15 | 156,308 |
| PERIOD 2d - Decontamination Following Wet Fuel Storage | | | | | | | | | | | | | | | | | | | | | |
| Period 2d Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| 2d.1.1 | Remove spent fuel racks | 347 | 35 | 86 | 41 | - | 703 | - | 373 | 1,585 | 1,585 | - | - | - | 2,092 | - | - | - | 132,919 | 576 | - |
| Disposal of Plant Systems | | | | | | | | | | | | | | | | | | | | | |
| 2d.1.2.1 | Electrical - Contaminated - Fuel Pool | - | 152 | 2 | 5 | 103 | 8 | - | 56 | 325 | 325 | - | - | 615 | 23 | - | - | - | 26,449 | 2,077 | - |
| 2d.1.2.2 | Electrical - Decontaminated - Fuel Pool | - | 947 | 12 | 43 | 986 | - | - | 392 | 2,380 | 2,380 | - | - | 5,893 | - | - | - | - | 239,327 | 12,340 | - |
| 2d.1.2.3 | HVAC - Contaminated - Fuel Pool | - | 160 | 4 | 11 | 234 | 18 | - | 82 | 508 | 508 | - | - | 1,398 | 53 | - | - | - | 60,110 | 2,157 | - |
| 2d.1.2.4 | Safeguards Chilled Water - RCA | - | 85 | 1 | 4 | 83 | - | - | 34 | 207 | 207 | - | - | 495 | - | - | - | - | 20,100 | 1,019 | - |
| 2d.1.2.5 | Spent Fuel Pool Cooling | 303 | 357 | 34 | 32 | 135 | 450 | - | 382 | 1,693 | 1,693 | - | - | 806 | 1,325 | - | - | - | 117,816 | 7,613 | - |
| 2d.1.2.6 | Station & Instrument Air - RCA Fuel Pool | - | 20 | 0 | 1 | 14 | - | - | 7 | 42 | 42 | - | - | 83 | - | - | - | - | 3,374 | 263 | - |
| 2d.1.2 | Totals | 303 | 1,721 | 52 | 96 | 1,554 | 476 | - | 954 | 5,157 | 5,157 | - | - | 9,290 | 1,401 | - | - | - | 467,176 | 25,468 | - |
| 2d.1.4 | Scaffolding in support of decommissioning | - | 233 | 1 | 0 | 6 | 1 | - | 59 | 301 | 301 | - | - | 35 | 3 | - | - | - | 1,746 | 1,592 | - |
| 2d.1 | Subtotal Period 2d Activity Costs | 650 | 1,989 | 139 | 138 | 1,561 | 1,180 | - | 1,386 | 7,042 | 7,042 | - | - | 9,325 | 3,496 | - | - | - | 601,841 | 27,637 | - |
| Period 2d Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 2d.2.1 | License Termination Survey Planning | - | - | - | - | - | - | 1,037 | 311 | 1,348 | 1,348 | - | - | - | - | - | - | - | - | - | 6,240 |
| 2d.2 | Subtotal Period 2d Additional Costs | - | - | - | - | - | - | 1,037 | 311 | 1,348 | 1,348 | - | - | - | - | - | - | - | - | - | 6,240 |
| Period 2d Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 2d.3.1 | Process decommissioning water waste | 30 | - | 21 | 38 | - | 86 | - | 44 | 220 | 220 | - | - | - | 197 | - | - | - | 11,793 | 38 | - |
| 2d.3.2 | Process decommissioning chemical flush waste | 1 | - | 34 | 110 | - | 251 | - | 83 | 478 | 478 | - | - | - | 324 | - | - | - | 34,576 | 61 | - |
| 2d.3.3 | Small tool allowance | - | 37 | - | - | - | - | - | 6 | 42 | 42 | - | - | - | - | - | - | - | - | - | - |
| 2d.3.4 | Decommissioning Equipment Disposition | - | - | 130 | 67 | 1,112 | 178 | - | 234 | 1,722 | 1,722 | - | - | 6,000 | 529 | - | - | - | 303,608 | 147 | - |
| 2d.3.5 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 975 | - | 975 | - | 975 | - | - | - | - | - | - | - | - | - |
| 2d.3 | Subtotal Period 2d Collateral Costs | 31 | 37 | 185 | 215 | 1,112 | 514 | 975 | 367 | 3,437 | 2,462 | 975 | - | 6,000 | 1,050 | - | - | - | 349,977 | 246 | - |
| Period 2d Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 2d.4.1 | Decon supplies | 59 | - | - | - | - | - | - | 15 | 73 | 73 | - | - | - | - | - | - | - | - | - | - |
| 2d.4.2 | Insurance | - | - | - | - | - | - | 378 | 38 | 416 | 416 | - | - | - | - | - | - | - | - | - | - |
| 2d.4.3 | Property taxes | - | - | - | - | - | - | 2,004 | 200 | 2,204 | 2,204 | - | - | - | - | - | - | - | - | - | - |
| 2d.4.4 | Health physics supplies | - | 575 | - | - | - | - | - | 144 | 719 | 719 | - | - | - | - | - | - | - | - | - | - |
| 2d.4.5 | Heavy equipment rental | - | 2,007 | - | - | - | - | - | 301 | 2,308 | 2,308 | - | - | - | - | - | - | - | - | - | - |
| 2d.4.6 | Disposal of DAW generated | - | - | 16 | 7 | - | 68 | - | 20 | 111 | 111 | - | - | 830 | - | - | - | - | 16,609 | 27 | - |
| 2d.4.7 | Plant energy budget | - | - | - | - | - | - | 506 | 76 | 582 | 582 | - | - | - | - | - | - | - | - | - | - |
| 2d.4.8 | NRC Fees | - | - | - | - | - | 439 | - | 44 | 483 | 483 | - | - | - | - | - | - | - | - | - | - |
| 2d.4.9 | Emergency Planning Fees | - | - | - | - | - | 58 | - | 6 | 64 | - | 64 | - | - | - | - | - | - | - | - | - |
| 2d.4.10 | Fixed Overhead | - | - | - | - | - | - | 929 | 139 | 1,068 | 1,068 | - | - | - | - | - | - | - | - | - | - |
| 2d.4.11 | Liquid Radwaste Processing Equipment/Services | - | - | - | - | - | - | 332 | 50 | 381 | 381 | - | - | - | - | - | - | - | - | - | - |
| 2d.4.12 | ISFSI Operating Costs | - | - | - | - | - | - | 44 | 7 | 50 | - | 50 | - | - | - | - | - | - | - | - | - |
| 2d.4.13 | Railroad Track Maintenance | - | - | - | - | - | - | 49 | 7 | 56 | 56 | - | - | - | - | - | - | - | - | - | - |
| 2d.4.14 | Remedial Actions Surveys | - | - | - | - | - | - | 875 | 131 | 1,006 | 1,006 | - | - | - | - | - | - | - | - | - | - |
| 2d.4.15 | Security Staff Cost | - | - | - | - | - | - | 5,782 | 867 | 6,649 | 4,694 | 1,955 | - | - | - | - | - | - | - | - | 84,454 |
| 2d.4.16 | DOC Staff Cost | - | - | - | - | - | - | 6,401 | 960 | 7,361 | 7,361 | - | - | - | - | - | - | - | - | - | 70,243 |
| 2d.4.17 | Utility Staff Cost | - | - | - | - | - | - | 8,100 | 1,215 | 9,315 | 8,858 | 456 | - | - | - | - | - | - | - | - | 126,681 |
| 2d.4 | Subtotal Period 2d Period-Dependent Costs | 59 | 2,582 | 16 | 7 | - | 68 | 25,896 | 4,220 | 32,848 | 30,323 | 2,525 | - | - | 830 | - | - | - | 16,609 | 27 | 281,377 |
| 2d.0 | TOTAL PERIOD 2d COST | 740 | 4,608 | 340 | 360 | 2,673 | 1,763 | 27,908 | 6,284 | 44,675 | 41,175 | 3,501 | - | 15,325 | 5,377 | - | - | - | 968,427 | 27,910 | 287,617 |
| PERIOD 2f - License Termination | | | | | | | | | | | | | | | | | | | | | |
| Period 2f Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| 2f.1.1 | ORISE confirmatory survey | - | - | - | - | - | - | 166 | 50 | 216 | 216 | - | - | - | - | - | - | - | - | - | - |
| 2f.1.2 | Terminate license | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 2f.1 | Subtotal Period 2f Activity Costs | - | - | - | - | - | - | 166 | 50 | 216 | 216 | - | - | - | - | - | - | - | - | - | - |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table F-1
Prairie Island DECON Unit 1
DECON Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|---|--------------|---------------|-----------------|-----------------|---------------------------|---------------------|----------------|-------------------|----------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| Period 2f Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 2f.2.1 | License Termination Survey | - | - | - | - | - | - | 3,199 | 960 | 4,159 | 4,159 | - | - | - | - | - | - | - | - | 40,531 | 3,120 |
| 2f.2 | Subtotal Period 2f Additional Costs | - | - | - | - | - | - | 3,199 | 960 | 4,159 | 4,159 | - | - | - | - | - | - | - | - | 40,531 | 3,120 |
| Period 2f Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 2f.3.1 | DOC staff relocation expenses | - | - | - | - | - | - | 1,264 | 190 | 1,454 | 1,454 | - | - | - | - | - | - | - | - | - | - |
| 2f.3.2 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 934 | - | 934 | - | 934 | - | - | - | - | - | - | - | - | - |
| 2f.3 | Subtotal Period 2f Collateral Costs | - | - | - | - | - | - | 2,198 | 190 | 2,388 | 1,454 | 934 | - | - | - | - | - | - | - | - | - |
| Period 2f Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 2f.4.1 | Insurance | - | - | - | - | - | - | 362 | 36 | 398 | 398 | - | - | - | - | - | - | - | - | - | - |
| 2f.4.2 | Property taxes | - | - | - | - | - | - | 1,771 | 177 | 1,948 | 1,948 | - | - | - | - | - | - | - | - | - | - |
| 2f.4.3 | Health physics supplies | - | 501 | - | - | - | - | - | 125 | 626 | 626 | - | - | - | - | - | - | - | - | - | - |
| 2f.4.4 | Disposal of DAW generated | - | - | 7 | 3 | - | 28 | - | 8 | 45 | 45 | - | - | 334 | - | - | - | - | 6,685 | 11 | - |
| 2f.4.5 | Plant energy budget | - | - | - | - | - | - | 243 | 36 | 279 | 279 | - | - | - | - | - | - | - | - | - | - |
| 2f.4.6 | NRC Fees | - | - | - | - | - | - | 422 | 42 | 465 | 465 | - | - | - | - | - | - | - | - | - | - |
| 2f.4.7 | Emergency Planning Fees | - | - | - | - | - | - | 55 | 6 | 61 | - | 61 | - | - | - | - | - | - | - | - | - |
| 2f.4.8 | Fixed Overhead | - | - | - | - | - | - | 890 | 133 | 1,023 | 1,023 | - | - | - | - | - | - | - | - | - | - |
| 2f.4.9 | ISFSI Operating Costs | - | - | - | - | - | - | 42 | 6 | 48 | - | 48 | - | - | - | - | - | - | - | - | - |
| 2f.4.10 | Railroad Track Maintenance | - | - | - | - | - | - | 47 | 7 | 54 | 54 | - | - | - | - | - | - | - | - | - | - |
| 2f.4.11 | Security Staff Cost | - | - | - | - | - | - | 5,538 | 831 | 6,369 | 4,497 | 1,873 | - | - | - | - | - | - | - | - | 80,898 |
| 2f.4.12 | DOC Staff Cost | - | - | - | - | - | - | 4,238 | 636 | 4,874 | 4,874 | - | - | - | - | - | - | - | - | - | 46,283 |
| 2f.4.13 | Utility Staff Cost | - | - | - | - | - | - | 4,011 | 602 | 4,613 | 4,175 | 438 | - | - | - | - | - | - | - | - | 59,507 |
| 2f.4 | Subtotal Period 2f Period-Dependent Costs | - | 501 | 7 | 3 | - | 28 | 17,620 | 2,646 | 20,803 | 18,384 | 2,420 | - | 334 | - | - | - | - | 6,685 | 11 | 186,687 |
| 2f.0 | TOTAL PERIOD 2f COST | - | 501 | 7 | 3 | - | 28 | 23,183 | 3,845 | 27,566 | 24,212 | 3,354 | - | - | 334 | - | - | - | 6,685 | 40,542 | 189,807 |
| PERIOD 2 TOTALS | | 5,134 | 58,338 | 20,860 | 7,153 | 22,473 | 41,926 | 290,708 | 85,924 | 532,517 | 429,593 | 97,348 | 5,576 | 138,734 | 144,239 | 237 | 673 | - | 13,198,890 | 527,156 | 1,927,726 |
| PERIOD 3b - Site Restoration | | | | | | | | | | | | | | | | | | | | | |
| Period 3b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| Demolition of Remaining Site Buildings | | | | | | | | | | | | | | | | | | | | | |
| 3b.1.1.1 | Reactor | - | 4,644 | - | - | - | - | - | 697 | 5,341 | - | - | 5,341 | - | - | - | - | - | - | 44,669 | - |
| 3b.1.1.2 | Condensate Storage Tank Foundation | - | 3 | - | - | - | - | - | 0 | 4 | - | - | 4 | - | - | - | - | - | - | 16 | - |
| 3b.1.1.3 | Structures below 3' below grade | - | 1,651 | - | - | - | - | - | 248 | 1,899 | - | - | 1,899 | - | - | - | - | - | - | 8,411 | - |
| 3b.1.1.4 | Turbine | - | 2,139 | - | - | - | - | - | 321 | 2,460 | - | - | 2,460 | - | - | - | - | - | - | 21,985 | - |
| 3b.1.1.5 | Turbine Pedestal | - | 365 | - | - | - | - | - | 55 | 420 | - | - | 420 | - | - | - | - | - | - | 1,857 | - |
| 3b.1.1 | Totals | - | 8,803 | - | - | - | - | - | 1,320 | 10,123 | - | - | 10,123 | - | - | - | - | - | - | 76,939 | - |
| Site Closeout Activities | | | | | | | | | | | | | | | | | | | | | |
| 3b.1.2 | Grade & landscape site | - | 448 | - | - | - | - | - | 67 | 515 | - | - | 515 | - | - | - | - | - | - | 921 | - |
| 3b.1.3 | Final report to NRC | - | - | - | - | - | - | 200 | 30 | 231 | 231 | - | - | - | - | - | - | - | - | - | 1,560 |
| 3b.1 | Subtotal Period 3b Activity Costs | - | 9,251 | - | - | - | - | 200 | 1,418 | 10,869 | 231 | - | 10,639 | - | - | - | - | - | - | 77,859 | 1,560 |
| Period 3b Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 3b.2.1 | Clean Concrete Disposal | - | 2,242 | - | - | - | - | 5 | 337 | 2,583 | - | - | 2,583 | - | - | - | - | - | - | 8,386 | - |
| 3b.2.2 | Intake Structure cofferdam | - | 623 | - | - | - | - | - | 93 | 716 | - | - | 716 | - | - | - | - | - | - | 5,168 | - |
| 3b.2.3 | Construction Debris | - | - | - | - | - | - | 10 | 2 | 12 | - | - | 12 | - | - | - | - | - | - | - | - |
| 3b.2.4 | Backfill | - | 3,011 | - | - | - | - | - | 452 | 3,462 | - | - | 3,462 | - | - | - | - | - | - | 2,904 | - |
| 3b.2.5 | Disposition of Original Casks | - | 24 | 80 | 418 | - | 2,390 | - | 728 | 3,640 | 3,640 | - | - | 8,929 | - | - | - | - | 1,059,612 | 146 | - |
| 3b.2 | Subtotal Period 3b Additional Costs | - | 5,899 | 80 | 418 | - | 2,390 | 15 | 1,611 | 10,413 | 3,640 | - | 6,773 | - | 8,929 | - | - | - | 1,059,612 | 16,604 | - |
| Period 3b Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 3b.3.1 | Small tool allowance | - | 121 | - | - | - | - | - | 18 | 139 | - | - | 139 | - | - | - | - | - | - | - | - |
| 3b.3.2 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 2,649 | - | 2,649 | - | 2,649 | - | - | - | - | - | - | - | - | - |
| 3b.3 | Subtotal Period 3b Collateral Costs | - | 121 | - | - | - | - | 2,649 | 18 | 2,787 | - | 2,649 | 139 | - | - | - | - | - | - | - | - |
| Period 3b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 3b.4.1 | Insurance | - | - | - | - | - | - | 513 | 51 | 565 | 565 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.2 | Property taxes | - | - | - | - | - | - | 4,167 | 417 | 4,583 | - | 4,583 | - | - | - | - | - | - | - | - | - |
| 3b.4.3 | Heavy equipment rental | - | 7,144 | - | - | - | - | - | 1,072 | 8,215 | - | - | 8,215 | - | - | - | - | - | - | - | - |
| 3b.4.4 | Plant energy budget | - | - | - | - | - | - | 344 | 52 | 395 | - | 395 | - | - | - | - | - | - | - | - | - |
| 3b.4.5 | NRC ISFSI Fees | - | - | - | - | - | - | 218 | 22 | 239 | - | 239 | - | - | - | - | - | - | - | - | - |
| 3b.4.6 | Emergency Planning Fees | - | - | - | - | - | - | 157 | 16 | 173 | - | 173 | - | - | - | - | - | - | - | - | - |
| 3b.4.7 | Fixed Overhead | - | - | - | - | - | - | 1,024 | 154 | 1,178 | 397 | 781 | - | - | - | - | - | - | - | - | - |
| 3b.4.8 | ISFSI Operating Costs | - | - | - | - | - | - | 119 | 18 | 136 | - | 136 | - | - | - | - | - | - | - | - | - |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table F-1
Prairie Island DECON Unit 1
DECON Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| Period 3b Period-Dependent Costs (continued) | | | | | | | | | | | | | | | | | | | | | |
| 3b.4.9 | Railroad Track Maintenance | - | - | - | - | - | - | 361 | 54 | 416 | 153 | 263 | - | - | - | - | - | - | - | - | - |
| 3b.4.10 | Security Staff Cost | - | - | - | - | - | - | 4,616 | 692 | 5,308 | - | 5,308 | - | - | - | - | - | - | - | - | 57,340 |
| 3b.4.11 | DOC Staff Cost | - | - | - | - | - | - | 10,921 | 1,638 | 12,559 | - | - | 12,559 | - | - | - | - | - | - | - | 116,885 |
| 3b.4.12 | Utility Staff Cost | - | - | - | - | - | - | 5,170 | 776 | 5,946 | - | 1,278 | 4,668 | - | - | - | - | - | - | - | 76,637 |
| 3b.4 | Subtotal Period 3b Period-Dependent Costs | - | 7,144 | - | - | - | - | 27,610 | 4,960 | 39,714 | 1,114 | 13,158 | 25,442 | - | - | - | - | - | - | - | 250,861 |
| 3b.0 | TOTAL PERIOD 3b COST | - | 22,414 | 80 | 418 | - | 2,390 | 30,474 | 8,008 | 63,784 | 4,985 | 15,807 | 42,993 | - | 8,929 | - | - | - | 1,059,612 | 94,463 | 252,421 |
| PERIOD 3c - Fuel Storage Operations/Shipping | | | | | | | | | | | | | | | | | | | | | |
| Period 3c Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| Period 3c Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 3c.3.1 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 625,425 | 93,814 | 719,239 | - | 719,239 | - | - | - | - | - | - | - | - | - |
| 3c.3.3 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 219,357 | - | 219,357 | - | - | - | - | - | - | - | - | - | - | - |
| 3c.3 | Subtotal Period 3c Collateral Costs | - | - | - | - | - | - | 844,782 | 93,814 | 938,596 | - | 938,596 | - | - | - | - | - | - | - | - | - |
| Period 3c Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 3c.4.1 | Insurance | - | - | - | - | - | - | 42,518 | 4,252 | 46,770 | - | 46,770 | - | - | - | - | - | - | - | - | - |
| 3c.4.2 | Property taxes | - | - | - | - | - | - | 242,919 | 24,292 | 267,210 | - | 267,210 | - | - | - | - | - | - | - | - | - |
| 3c.4.4 | NRC ISFSI Fees | - | - | - | - | - | - | 19,571 | 1,957 | 21,528 | - | 21,528 | - | - | - | - | - | - | - | - | - |
| 3c.4.5 | Emergency Planning Fees | - | - | - | - | - | - | 13,018 | 1,302 | 14,320 | - | 14,320 | - | - | - | - | - | - | - | - | - |
| 3c.4.6 | Fixed Overhead | - | - | - | - | - | - | 28,613 | 4,292 | 32,905 | - | 32,905 | - | - | - | - | - | - | - | - | - |
| 3c.4.7 | ISFSI Operating Costs | - | - | - | - | - | - | 9,828 | 1,474 | 11,302 | - | 11,302 | - | - | - | - | - | - | - | - | - |
| 3c.4.8 | Railroad Track Maintenance | - | - | - | - | - | - | 10,979 | 1,647 | 12,626 | - | 12,626 | - | - | - | - | - | - | - | - | - |
| 3c.4.9 | Security Staff Cost | - | - | - | - | - | - | 382,242 | 57,336 | 439,578 | - | 439,578 | - | - | - | - | - | - | - | - | 4,748,373 |
| 3c.4.10 | DOC Staff Cost | - | - | - | - | - | - | 26,917 | 4,038 | 30,955 | - | 30,955 | - | - | - | - | - | - | - | - | 182,630 |
| 3c.4.11 | Utility Staff Cost | - | - | - | - | - | - | 165,731 | 24,860 | 190,591 | - | 190,591 | - | - | - | - | - | - | - | - | 2,419,844 |
| 3c.4 | Subtotal Period 3c Period-Dependent Costs | - | - | - | - | - | - | 942,335 | 125,449 | 1,067,784 | - | 1,067,784 | - | - | - | - | - | - | - | - | 7,350,846 |
| 3c.0 | TOTAL PERIOD 3c COST | - | - | - | - | - | - | 1,787,117 | 219,263 | 2,006,380 | - | 2,006,380 | - | - | - | - | - | - | - | - | 7,350,846 |
| PERIOD 3d - GTCC shipping | | | | | | | | | | | | | | | | | | | | | |
| Period 3d Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| Nuclear Steam Supply System Removal | | | | | | | | | | | | | | | | | | | | | |
| 3d.1.1.1 | Vessel & Internals GTCC Disposal | - | - | 1,444 | - | - | - | 8,680 | 1,663 | 11,787 | 11,787 | - | - | - | - | - | - | 1,773 | 344,823 | - | - |
| 3d.1.1 | Totals | - | - | 1,444 | - | - | - | 8,680 | 1,663 | 11,787 | 11,787 | - | - | - | - | - | - | 1,773 | 344,823 | - | - |
| 3d.1 | Subtotal Period 3d Activity Costs | - | - | 1,444 | - | - | - | 8,680 | 1,663 | 11,787 | 11,787 | - | - | - | - | - | - | 1,773 | 344,823 | - | - |
| Period 3d Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 3d.3.1 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 28 | 4 | 32 | - | 32 | - | - | - | - | - | - | - | - | - |
| 3d.3.2 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 48 | - | 48 | - | 48 | - | - | - | - | - | - | - | - | - |
| 3d.3 | Subtotal Period 3d Collateral Costs | - | - | - | - | - | - | 76 | 4 | 80 | - | 80 | - | - | - | - | - | - | - | - | - |
| Period 3d Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 3d.4.1 | Insurance | - | - | - | - | - | - | 9 | 1 | 10 | 10 | - | - | - | - | - | - | - | - | - | - |
| 3d.4.2 | Property taxes | - | - | - | - | - | - | 53 | 5 | 58 | 58 | - | - | - | - | - | - | - | - | - | - |
| 3d.4.4 | NRC ISFSI Fees | - | - | - | - | - | - | 4 | 0 | 4 | - | 4 | - | - | - | - | - | - | - | - | - |
| 3d.4.5 | Emergency Planning Fees | - | - | - | - | - | - | 3 | 0 | 3 | - | 3 | - | - | - | - | - | - | - | - | - |
| 3d.4.6 | Fixed Overhead | - | - | - | - | - | - | 6 | 1 | 7 | 7 | - | 3 | - | - | - | - | - | - | - | - |
| 3d.4.7 | Railroad Track Maintenance | - | - | - | - | - | - | 2 | 0 | 3 | 3 | - | - | - | - | - | - | - | - | - | - |
| 3d.4.8 | Security Staff Cost | - | - | - | - | - | - | 83 | 13 | 96 | 96 | - | - | - | - | - | - | - | - | - | 1,037 |
| 3d.4.9 | Utility Staff Cost | - | - | - | - | - | - | 19 | 3 | 22 | 22 | - | - | - | - | - | - | - | - | - | 269 |
| 3d.4 | Subtotal Period 3d Period-Dependent Costs | - | - | - | - | - | - | 181 | 24 | 204 | 197 | 7 | - | - | - | - | - | - | - | - | 1,306 |
| 3d.0 | TOTAL PERIOD 3d COST | - | - | 1,444 | - | - | - | 8,680 | 1,691 | 12,071 | 11,984 | 87 | - | - | - | - | - | 1,773 | 344,823 | - | 1,306 |
| PERIOD 3e - ISFSI Decontamination | | | | | | | | | | | | | | | | | | | | | |
| Period 3e Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| Period 3e Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 3e.2.1 | License Termination ISFSI | - | 0 | 2 | 17 | - | - | 142 | 339 | 1,696 | 1,696 | - | - | - | 424 | - | - | - | 65,754 | 5,882 | 1,161 |
| 3e.2 | Subtotal Period 3e Additional Costs | - | 0 | 2 | 17 | - | - | 142 | 339 | 1,696 | 1,696 | - | - | - | 424 | - | - | - | 65,754 | 5,882 | 1,161 |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table F-1
Prairie Island DECON Unit 1
DECON Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|-------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| Period 3e Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3e.4.1 | Insurance | - | - | - | - | - | - | 93 | 23 | 116 | 116 | - | - | - | - | - | - | - | - | - | - | |
| 3e.4.2 | Property taxes | - | - | - | - | - | - | 56 | 14 | 69 | 69 | - | - | - | - | - | - | - | - | - | - | |
| 3e.4.3 | Plant energy budget | - | - | - | - | - | - | 11 | 3 | 13 | 13 | - | - | - | - | - | - | - | - | - | - | |
| 3e.4.4 | Fixed Overhead | - | - | - | - | - | - | 54 | 14 | 68 | 68 | - | - | - | - | - | - | - | - | - | - | |
| 3e.4.5 | Railroad Track Maintenance | - | - | - | - | - | - | 21 | 5 | 26 | 26 | - | - | - | - | - | - | - | - | - | - | |
| 3e.4.6 | Security Staff Cost | - | - | - | - | - | - | 174 | 43 | 217 | 217 | - | - | - | - | - | - | - | - | - | 2,500 | |
| 3e.4.7 | Utility Staff Cost | - | - | - | - | - | - | 129 | 32 | 161 | 161 | - | - | - | - | - | - | - | - | - | 1,896 | |
| 3e.4 | Subtotal Period 3e Period-Dependent Costs | - | - | - | - | - | - | 536 | 134 | 670 | 670 | - | - | - | - | - | - | - | - | - | 4,396 | |
| 3e.0 | TOTAL PERIOD 3e COST | - | 0 | 2 | 17 | - | 142 | 1,733 | 473 | 2,367 | 2,367 | - | - | - | 424 | - | - | - | 65,754 | 5,882 | 5,556 | |
| PERIOD 3f - ISFSI Site Restoration | | | | | | | | | | | | | | | | | | | | | | |
| Period 3f Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Period 3f Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3f.2.1 | Demolition and Site Restoration of ISFSI | - | 1,121 | - | - | - | - | 161 | 192 | 1,474 | - | - | 1,474 | - | - | - | - | - | - | - | 4,846 | 80 |
| 3f.2 | Subtotal Period 3f Additional Costs | - | 1,121 | - | - | - | - | 161 | 192 | 1,474 | - | - | 1,474 | - | - | - | - | - | - | - | 4,846 | 80 |
| Period 3f Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3f.3.1 | Small tool allowance | - | 7 | - | - | - | - | - | 1 | 8 | - | - | 8 | - | - | - | - | - | - | - | - | - |
| 3f.3 | Subtotal Period 3f Collateral Costs | - | 7 | - | - | - | - | - | 1 | 8 | - | - | 8 | - | - | - | - | - | - | - | - | - |
| Period 3f Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3f.4.2 | Property taxes | - | - | - | - | - | - | 28 | 3 | 31 | - | - | 31 | - | - | - | - | - | - | - | - | - |
| 3f.4.3 | Heavy equipment rental | - | 59 | - | - | - | - | - | 9 | 68 | - | - | 68 | - | - | - | - | - | - | - | - | - |
| 3f.4.4 | Plant energy budget | - | - | - | - | - | - | 6 | 1 | 6 | - | - | 6 | - | - | - | - | - | - | - | - | - |
| 3f.4.5 | Fixed Overhead | - | - | - | - | - | - | 28 | 4 | 32 | - | - | 32 | - | - | - | - | - | - | - | - | - |
| 3f.4.6 | Railroad Track Maintenance | - | - | - | - | - | - | 11 | 2 | 12 | - | - | 12 | - | - | - | - | - | - | - | - | - |
| 3f.4.7 | Security Staff Cost | - | - | - | - | - | - | 89 | 13 | 102 | - | - | 102 | - | - | - | - | - | - | - | - | 1,281 |
| 3f.4.8 | Utility Staff Cost | - | - | - | - | - | - | 55 | 8 | 63 | - | - | 63 | - | - | - | - | - | - | - | - | 795 |
| 3f.4 | Subtotal Period 3f Period-Dependent Costs | - | 59 | - | - | - | - | 216 | 40 | 315 | - | - | 315 | - | - | - | - | - | - | - | - | 2,076 |
| 3f.0 | TOTAL PERIOD 3f COST | - | 1,187 | - | - | - | - | 377 | 233 | 1,798 | - | - | 1,798 | - | - | - | - | - | - | - | 4,846 | 2,156 |
| PERIOD 3 TOTALS | | - | 23,601 | 1,525 | 435 | - | 11,212 | 1,819,958 | 229,668 | 2,086,399 | 19,335 | 2,022,273 | 44,790 | - | 9,353 | - | - | 1,773 | 1,470,189 | 105,190 | 7,612,285 | |
| TOTAL COST TO DECOMMISSION | | 8,929 | 87,919 | 22,838 | 8,068 | 22,651 | 58,542 | 2,229,014 | 336,495 | 2,774,456 | 596,408 | 2,126,090 | 51,958 | 144,866 | 167,553 | 826 | 673 | 1,773 | 15,279,140 | 677,859 | 10,540,740 | |

| | |
|--|--|
| TOTAL COST TO DECOMMISSION WITH 13.8% CONTINGENCY: | \$2,774,456 thousands of 2020 dollars |
| TOTAL NRC LICENSE TERMINATION COST IS 21.5% OR: | \$596,408 thousands of 2020 dollars |
| SPENT FUEL MANAGEMENT COST IS 76.63% OR: | \$2,126,090 thousands of 2020 dollars |
| NON-NUCLEAR DEMOLITION COST IS 1.87% OR: | \$51,958 thousands of 2020 dollars |
| TOTAL LOW-LEVEL RADIOACTIVE WASTE VOLUME BURIED (EXCLUDING GTCC): | 169,051 Cubic Feet |
| TOTAL GREATER THAN CLASS C RADWASTE VOLUME GENERATED: | 1,773 Cubic Feet |
| TOTAL SCRAP METAL REMOVED: | 32,925 Tons |
| TOTAL CRAFT LABOR REQUIREMENTS: | 677,859 Man-hours |

End Notes:
n/a - indicates that this activity not charged as decommissioning expense
a - indicates that this activity performed by decommissioning staff
0 - indicates that this value is less than 0.5 but is non-zero
A cell containing " - " indicates a zero value

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table F-2
Prairie Island DECON Unit 2
DECON Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|--|--|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| PERIOD 1a - Shutdown through Transition | | | | | | | | | | | | | | | | | | | | | |
| Period 1a Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| 1a.1.1 | Prepare preliminary decommissioning cost | - | - | - | - | - | - | 71 | 11 | 82 | 82 | - | - | - | - | - | - | - | - | - | 556 |
| 1a.1.2 | Notification of Cessation of Operations | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.3 | Remove fuel & source material | - | - | - | - | - | - | - | - | n/a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.4 | Notification of Permanent Defueling | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.5 | Deactivate plant systems & process waste | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.6 | Prepare and submit PSDAR | - | - | - | - | - | - | 110 | 16 | 126 | 126 | - | - | - | - | - | - | - | - | - | 855 |
| 1a.1.7 | Review plant dwgs & specs. | - | - | - | - | - | - | 253 | 38 | 291 | 291 | - | - | - | - | - | - | - | - | - | 1,967 |
| 1a.1.8 | Perform detailed rad survey | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.9 | Estimate by-product inventory | - | - | - | - | - | - | 55 | 8 | 63 | 63 | - | - | - | - | - | - | - | - | - | 428 |
| 1a.1.10 | End product description | - | - | - | - | - | - | 55 | 8 | 63 | 63 | - | - | - | - | - | - | - | - | - | 428 |
| 1a.1.11 | Detailed by-product inventory | - | - | - | - | - | - | 71 | 11 | 82 | 82 | - | - | - | - | - | - | - | - | - | 556 |
| 1a.1.12 | Define major work sequence | - | - | - | - | - | - | 412 | 62 | 474 | 474 | - | - | - | - | - | - | - | - | - | 3,207 |
| 1a.1.13 | Perform SER and EA | - | - | - | - | - | - | 170 | 26 | 196 | 196 | - | - | - | - | - | - | - | - | - | 1,326 |
| 1a.1.14 | Prepare/submit Defueled Technical Specifications | - | - | - | - | - | - | 412 | 62 | 474 | 474 | - | - | - | - | - | - | - | - | - | 3,207 |
| 1a.1.15 | Perform Site-Specific Cost Study | - | - | - | - | - | - | 275 | 41 | 316 | 316 | - | - | - | - | - | - | - | - | - | 2,138 |
| 1a.1.16 | Prepare/submit Irradiated Fuel Management Plan | - | - | - | - | - | - | 55 | 8 | 63 | 63 | - | - | - | - | - | - | - | - | - | 428 |
| Activity Specifications | | | | | | | | | | | | | | | | | | | | | |
| 1a.1.17.1 | Plant & temporary facilities | - | - | - | - | - | - | 270 | 41 | 311 | 280 | - | 31 | - | - | - | - | - | - | - | 2,104 |
| 1a.1.17.2 | Plant systems | - | - | - | - | - | - | 229 | 34 | 263 | 237 | - | 26 | - | - | - | - | - | - | - | 1,782 |
| 1a.1.17.3 | NSSS Decontamination Flush | - | - | - | - | - | - | 27 | 4 | 32 | 32 | - | - | - | - | - | - | - | - | - | 214 |
| 1a.1.17.4 | Reactor internals | - | - | - | - | - | - | 390 | 59 | 449 | 449 | - | - | - | - | - | - | - | - | - | 3,036 |
| 1a.1.17.5 | Reactor vessel | - | - | - | - | - | - | 357 | 54 | 411 | 411 | - | - | - | - | - | - | - | - | - | 2,779 |
| 1a.1.17.6 | Biological shield | - | - | - | - | - | - | 27 | 4 | 32 | 32 | - | - | - | - | - | - | - | - | - | 214 |
| 1a.1.17.7 | Steam generators | - | - | - | - | - | - | 171 | 26 | 197 | 197 | - | - | - | - | - | - | - | - | - | 1,334 |
| 1a.1.17.8 | Reinforced concrete | - | - | - | - | - | - | 88 | 13 | 101 | 51 | - | 51 | - | - | - | - | - | - | - | 684 |
| 1a.1.17.9 | Main Turbine | - | - | - | - | - | - | 22 | 3 | 25 | - | - | 25 | - | - | - | - | - | - | - | 171 |
| 1a.1.17.10 | Main Condensers | - | - | - | - | - | - | 22 | 3 | 25 | - | - | 25 | - | - | - | - | - | - | - | 171 |
| 1a.1.17.11 | Plant structures & buildings | - | - | - | - | - | - | 171 | 26 | 197 | 99 | - | 99 | - | - | - | - | - | - | - | 1,334 |
| 1a.1.17.12 | Waste management | - | - | - | - | - | - | 253 | 38 | 291 | 291 | - | - | - | - | - | - | - | - | - | 1,967 |
| 1a.1.17.13 | Facility & site closeout | - | - | - | - | - | - | 49 | 7 | 57 | 28 | - | 28 | - | - | - | - | - | - | - | 385 |
| 1a.1.17 | Total | - | - | - | - | - | - | 2,079 | 312 | 2,391 | 2,105 | - | 286 | - | - | - | - | - | - | - | 16,175 |
| Planning & Site Preparations | | | | | | | | | | | | | | | | | | | | | |
| 1a.1.18 | Prepare dismantling sequence | - | - | - | - | - | - | 132 | 20 | 152 | 152 | - | - | - | - | - | - | - | - | - | 1,026 |
| 1a.1.19 | Plant prep. & temp. svces | - | - | - | - | - | - | 3,500 | 525 | 4,025 | 4,025 | - | - | - | - | - | - | - | - | - | - |
| 1a.1.20 | Design water clean-up system | - | - | - | - | - | - | 77 | 12 | 88 | 88 | - | - | - | - | - | - | - | - | - | 599 |
| 1a.1.21 | Rigging/Cont. Cntrl Envlp/tooling/etc. | - | - | - | - | - | - | 2,400 | 360 | 2,760 | 2,760 | - | - | - | - | - | - | - | - | - | - |
| 1a.1.22 | Procure casks/liners & containers | - | - | - | - | - | - | 68 | 10 | 78 | 78 | - | - | - | - | - | - | - | - | - | 526 |
| 1a.1 | Subtotal Period 1a Activity Costs | - | - | - | - | - | - | 10,195 | 1,529 | 11,724 | 11,439 | - | 286 | - | - | - | - | - | - | - | 33,420 |
| Period 1a Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 1a.2.1 | Spent Fuel Pool Isolation | - | - | - | - | - | - | 8,450 | 1,268 | 9,718 | 9,718 | - | - | - | - | - | - | - | - | - | - |
| 1a.2 | Subtotal Period 1a Additional Costs | - | - | - | - | - | - | 8,450 | 1,268 | 9,718 | 9,718 | - | - | - | - | - | - | - | - | - | - |
| Period 1a Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 1a.3.1 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 1,330 | 199 | 1,529 | - | 1,529 | - | - | - | - | - | - | - | - | - |
| 1a.3.2 | Retention and Severance | - | - | - | - | - | - | 8,394 | 1,259 | 9,653 | 9,653 | - | - | - | - | - | - | - | - | - | - |
| 1a.3.3 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 1,249 | - | 1,249 | - | 1,249 | - | - | - | - | - | - | - | - | - |
| 1a.3 | Subtotal Period 1a Collateral Costs | - | - | - | - | - | - | 10,973 | 1,459 | 12,432 | 9,653 | 2,779 | - | - | - | - | - | - | - | - | - |
| Period 1a Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 1a.4.1 | Insurance | - | - | - | - | - | - | 1,660 | 166 | 1,826 | 1,826 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.2 | Property taxes | - | - | - | - | - | - | 3,623 | 362 | 3,985 | 3,985 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.3 | Health physics supplies | - | 578 | - | - | - | - | - | 144 | 722 | 722 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.4 | Heavy equipment rental | - | 753 | - | - | - | - | - | 113 | 866 | 866 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.5 | Disposal of DAW generated | - | - | 11 | 5 | - | 47 | - | 13 | 76 | 76 | - | - | 565 | - | - | - | - | 11,299 | 18 | - |
| 1a.4.6 | Plant energy budget | - | - | - | - | - | - | 1,621 | 243 | 1,864 | 1,864 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.7 | NRC Fees | - | - | - | - | - | - | 638 | 64 | 702 | 702 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.8 | Emergency Planning Fees | - | - | - | - | - | - | 2,174 | 217 | 2,392 | - | 2,392 | - | - | - | - | - | - | - | - | - |
| 1a.4.9 | Fixed Overhead | - | - | - | - | - | - | 1,440 | 216 | 1,656 | 1,656 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.10 | Spent Fuel Pool O&M | - | - | - | - | - | - | 422 | 63 | 486 | 486 | - | 486 | - | - | - | - | - | - | - | - |
| 1a.4.11 | ISFSI Operating Costs | - | - | - | - | - | - | 56 | 8 | 64 | - | 64 | - | - | - | - | - | - | - | - | - |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table F-2
Prairie Island DECON Unit 2
DECON Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|--|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| Period 1a Period-Dependent Costs (continued) | | | | | | | | | | | | | | | | | | | | | |
| 1a.4.12 | Railroad Track Maintenance | - | - | - | - | - | - | 63 | 9 | 72 | 72 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.13 | Security Staff Cost | - | - | - | - | - | - | 8,328 | 1,249 | 9,577 | 9,577 | - | - | - | - | - | - | - | - | - | 122,720 |
| 1a.4.14 | Utility Staff Cost | - | - | - | - | - | - | 21,681 | 3,252 | 24,933 | 24,933 | - | - | - | - | - | - | - | - | - | 345,280 |
| 1a.4 | Subtotal Period 1a Period-Dependent Costs | - | 1,331 | 11 | 5 | - | 47 | 41,706 | 6,122 | 49,221 | 46,279 | 2,942 | - | - | 565 | - | - | - | 11,299 | 18 | 468,000 |
| 1a.0 | TOTAL PERIOD 1a COST | - | 1,331 | 11 | 5 | - | 47 | 71,324 | 10,377 | 83,095 | 77,089 | 5,720 | 286 | - | 565 | - | - | - | 11,299 | 18 | 501,420 |
| PERIOD 1b - Decommissioning Preparations | | | | | | | | | | | | | | | | | | | | | |
| Period 1b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| Detailed Work Procedures | | | | | | | | | | | | | | | | | | | | | |
| 1b.1.1.1 | Plant systems | - | - | - | - | - | - | 260 | 39 | 299 | 269 | - | 30 | - | - | - | - | - | - | - | 2,024 |
| 1b.1.1.2 | NSSS Decontamination Flush | - | - | - | - | - | - | 55 | 8 | 63 | 63 | - | - | - | - | - | - | - | - | - | 428 |
| 1b.1.1.3 | Reactor internals | - | - | - | - | - | - | 137 | 21 | 158 | 158 | - | - | - | - | - | - | - | - | - | 1,069 |
| 1b.1.1.4 | Remaining buildings | - | - | - | - | - | - | 74 | 11 | 85 | 21 | - | 64 | - | - | - | - | - | - | - | 577 |
| 1b.1.1.5 | CRD cooling assembly | - | - | - | - | - | - | 55 | 8 | 63 | 63 | - | - | - | - | - | - | - | - | - | 428 |
| 1b.1.1.6 | CRD housings & ICI tubes | - | - | - | - | - | - | 55 | 8 | 63 | 63 | - | - | - | - | - | - | - | - | - | 428 |
| 1b.1.1.7 | Incore instrumentation | - | - | - | - | - | - | 55 | 8 | 63 | 63 | - | - | - | - | - | - | - | - | - | 428 |
| 1b.1.1.8 | Reactor vessel | - | - | - | - | - | - | 199 | 30 | 229 | 229 | - | - | - | - | - | - | - | - | - | 1,552 |
| 1b.1.1.9 | Facility closeout | - | - | - | - | - | - | 66 | 10 | 76 | 38 | - | 38 | - | - | - | - | - | - | - | 513 |
| 1b.1.1.10 | Missile shields | - | - | - | - | - | - | 25 | 4 | 28 | 28 | - | - | - | - | - | - | - | - | - | 192 |
| 1b.1.1.11 | Biological shield | - | - | - | - | - | - | 66 | 10 | 76 | 76 | - | - | - | - | - | - | - | - | - | 513 |
| 1b.1.1.12 | Steam generators | - | - | - | - | - | - | 253 | 38 | 291 | 291 | - | - | - | - | - | - | - | - | - | 1,967 |
| 1b.1.1.13 | Reinforced concrete | - | - | - | - | - | - | 55 | 8 | 63 | 32 | - | 32 | - | - | - | - | - | - | - | 428 |
| 1b.1.1.14 | Main Turbine | - | - | - | - | - | - | 86 | 13 | 99 | - | - | 99 | - | - | - | - | - | - | - | 667 |
| 1b.1.1.15 | Main Condensers | - | - | - | - | - | - | 86 | 13 | 99 | - | - | 99 | - | - | - | - | - | - | - | 667 |
| 1b.1.1.16 | Auxiliary building | - | - | - | - | - | - | 150 | 23 | 173 | 155 | - | 17 | - | - | - | - | - | - | - | 1,167 |
| 1b.1.1.17 | Reactor building | - | - | - | - | - | - | 150 | 23 | 173 | 155 | - | 17 | - | - | - | - | - | - | - | 1,167 |
| 1b.1.1 | Total | - | - | - | - | - | - | 1,827 | 274 | 2,101 | 1,706 | - | 395 | - | - | - | - | - | - | - | 14,215 |
| 1b.1.2 | Decon primary loop | 572 | - | - | - | - | - | - | 286 | 859 | 859 | - | - | - | - | - | - | - | - | 1,067 | - |
| 1b.1 | Subtotal Period 1b Activity Costs | 572 | - | - | - | - | - | 1,827 | 560 | 2,959 | 2,564 | - | 395 | - | - | - | - | - | - | 1,067 | 14,215 |
| Period 1b Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 1b.2.1 | Site Characterization | - | - | - | - | - | - | 1,505 | 451 | 1,956 | 1,956 | - | - | - | - | - | - | - | - | 8,988 | 3,563 |
| 1b.2.2 | Mixed/Hazardous Waste | - | - | 353 | 94 | 178 | - | - | 76 | 702 | 702 | - | - | 6,132 | - | - | - | - | 351,977 | 2,348 | - |
| 1b.2.3 | Asbestos Abatement | - | 2,526 | 3 | 150 | - | 1,369 | - | 996 | 5,044 | 5,044 | - | - | - | 12,843 | - | - | - | 166,959 | 20,907 | - |
| 1b.2 | Subtotal Period 1b Additional Costs | - | 2,526 | 356 | 244 | 178 | 1,369 | 1,505 | 1,524 | 7,702 | 7,702 | - | - | 6,132 | 12,843 | - | - | - | 518,936 | 32,243 | 3,563 |
| Period 1b Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 1b.3.1 | Decon equipment | 1,055 | - | - | - | - | - | - | 158 | 1,213 | 1,213 | - | - | - | - | - | - | - | - | - | - |
| 1b.3.2 | DOC staff relocation expenses | - | - | - | - | - | - | 1,264 | 190 | 1,454 | 1,454 | - | - | - | - | - | - | - | - | - | - |
| 1b.3.3 | Process decommissioning water waste | 25 | - | 16 | 29 | - | 66 | - | 35 | 172 | 172 | - | - | - | 152 | - | - | - | 9,127 | 30 | - |
| 1b.3.4 | Process decommissioning chemical flush waste | 2 | - | 61 | 199 | - | 3,889 | - | 1,009 | 5,159 | 5,159 | - | - | - | - | - | - | - | 62,689 | 110 | - |
| 1b.3.5 | Small tool allowance | - | 36 | - | - | - | - | - | 5 | 42 | 42 | - | - | - | - | - | - | - | - | - | - |
| 1b.3.6 | Pipe cutting equipment | - | 1,200 | - | - | - | - | - | 180 | 1,380 | 1,380 | - | - | - | - | - | - | - | - | - | - |
| 1b.3.7 | Decon rig | 2,104 | - | - | - | - | - | - | 316 | 2,419 | 2,419 | - | - | - | - | - | - | - | - | - | - |
| 1b.3.8 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 399 | 60 | 459 | - | 459 | - | - | - | - | - | - | - | - | - |
| 1b.3.9 | Retention and Severance | - | - | - | - | - | - | 4,017 | 603 | 4,620 | 4,620 | - | - | - | - | - | - | - | - | - | - |
| 1b.3.10 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 623 | - | 623 | - | 623 | - | - | - | - | - | - | - | - | - |
| 1b.3 | Subtotal Period 1b Collateral Costs | 3,185 | 1,236 | 77 | 228 | - | 3,955 | 6,303 | 2,555 | 17,540 | 16,458 | 1,082 | - | - | 152 | 588 | - | - | 71,815 | 140 | - |
| Period 1b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 1b.4.1 | Decon supplies | 38 | - | - | - | - | - | - | 9 | 47 | 47 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.2 | Insurance | - | - | - | - | - | - | 828 | 83 | 910 | 910 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.3 | Property taxes | - | - | - | - | - | - | 1,713 | 171 | 1,884 | 1,884 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.4 | Health physics supplies | - | 449 | - | - | - | - | - | 112 | 561 | 561 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.5 | Heavy equipment rental | - | 375 | - | - | - | - | - | 56 | 432 | 432 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.6 | Disposal of DAW generated | - | - | 6 | 3 | - | 27 | - | 8 | 43 | 43 | - | - | - | 324 | - | - | - | 6,473 | 11 | - |
| 1b.4.7 | Plant energy budget | - | - | - | - | - | - | 1,617 | 243 | 1,859 | 1,859 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.8 | NRC Fees | - | - | - | - | - | - | 196 | 20 | 216 | 216 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.9 | Emergency Planning Fees | - | - | - | - | - | - | 1,084 | 108 | 1,193 | - | 1,193 | - | - | - | - | - | - | - | - | - |
| 1b.4.10 | Fixed Overhead | - | - | - | - | - | - | 718 | 108 | 826 | 826 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.11 | Spent Fuel Pool O&M | - | - | - | - | - | - | 211 | 32 | 242 | - | 242 | - | - | - | - | - | - | - | - | - |
| 1b.4.12 | ISFSI Operating Costs | - | - | - | - | - | - | 28 | 4 | 32 | - | 32 | - | - | - | - | - | - | - | - | - |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table F-2
Prairie Island DECON Unit 2
DECON Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|--|---|--------------|--------------|-----------------|-----------------|---------------------------|---------------------|----------------|-------------------|----------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|---------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| Period 1b Period-Dependent Costs (continued) | | | | | | | | | | | | | | | | | | | | | | |
| 1b.4.13 | Railroad Track Maintenance | - | - | - | - | - | - | 31 | 5 | 36 | 36 | - | - | - | - | - | - | - | - | - | - | |
| 1b.4.14 | Security Staff Cost | - | - | - | - | - | - | 4,153 | 623 | 4,775 | 4,775 | - | - | - | - | - | - | - | - | - | 61,192 | |
| 1b.4.15 | DOC Staff Cost | - | - | - | - | - | - | 4,182 | 627 | 4,810 | 4,810 | - | - | - | - | - | - | - | - | - | 46,672 | |
| 1b.4.16 | Utility Staff Cost | - | - | - | - | - | - | 10,811 | 1,622 | 12,432 | 12,432 | - | - | - | - | - | - | - | - | - | 172,167 | |
| 1b.4 | Subtotal Period 1b Period-Dependent Costs | 38 | 825 | 6 | 3 | - | 27 | 25,571 | 3,830 | 30,299 | 28,832 | 1,467 | - | - | 324 | - | - | - | - | 6,473 | 11 | 280,031 |
| 1b.0 | TOTAL PERIOD 1b COST | 3,795 | 4,586 | 440 | 475 | 178 | 5,351 | 35,206 | 8,470 | 58,501 | 55,557 | 2,549 | 395 | 6,132 | 13,319 | 588 | - | - | 597,225 | 33,460 | 297,808 | |
| PERIOD 1 TOTALS | | 3,795 | 5,917 | 451 | 479 | 178 | 5,398 | 106,531 | 18,847 | 141,595 | 132,646 | 8,269 | 681 | 6,132 | 13,884 | 588 | - | - | 608,524 | 33,478 | 799,228 | |
| PERIOD 2a - Large Component Removal | | | | | | | | | | | | | | | | | | | | | | |
| Period 2a Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Nuclear Steam Supply System Removal | | | | | | | | | | | | | | | | | | | | | | |
| 2a.1.1.1 | Reactor Coolant Piping | 54 | 47 | 10 | 18 | - | 187 | - | 89 | 406 | 406 | - | - | - | 508 | - | - | - | 35,411 | 1,421 | - | |
| 2a.1.1.2 | Pressurizer Relief Tank | 24 | 21 | 6 | 12 | - | 125 | - | 51 | 238 | 238 | - | - | - | 338 | - | - | - | 23,594 | 630 | - | |
| 2a.1.1.3 | Reactor Coolant Pumps & Motors | 57 | 68 | 110 | 93 | - | 463 | - | 186 | 977 | 977 | - | - | - | 2,332 | - | - | - | 295,800 | 2,049 | 100 | |
| 2a.1.1.4 | Pressurizer | - | 77 | 503 | 97 | - | 776 | - | 278 | 1,732 | 1,732 | - | - | - | 2,196 | - | - | - | 185,015 | 1,666 | 938 | |
| 2a.1.1.5 | Steam Generators | - | 3,307 | 2,269 | 1,770 | 2,409 | 4,001 | - | 2,681 | 16,437 | 16,437 | - | - | 18,672 | 11,316 | - | - | - | 1,689,435 | 11,613 | 2,875 | |
| 2a.1.1.6 | CRDMs/ICIs/Service Structure Removal | 302 | 281 | 218 | 66 | - | 938 | - | 488 | 2,294 | 2,294 | - | - | - | 4,797 | - | - | - | 177,400 | 8,104 | - | |
| 2a.1.1.7 | Reactor Vessel Internals | 82 | 4,861 | 13,621 | 929 | - | 9,015 | 307 | 11,878 | 40,693 | 40,693 | - | - | - | 501 | 125 | 673 | - | 164,987 | 25,123 | 1,163 | |
| 2a.1.1.8 | Reactor Vessel | 94 | 6,046 | 2,028 | 728 | - | 2,975 | 307 | 6,804 | 18,982 | 18,982 | - | - | - | 8,073 | - | - | - | 576,524 | 25,123 | 1,163 | |
| 2a.1.1 | Totals | 613 | 14,709 | 18,764 | 3,714 | 2,409 | 18,480 | 614 | 22,455 | 81,759 | 81,759 | - | - | 18,672 | 30,062 | 125 | 673 | - | 3,148,166 | 75,729 | 6,240 | |
| Removal of Major Equipment | | | | | | | | | | | | | | | | | | | | | | |
| 2a.1.2 | Main Turbine/Generator | - | 331 | 172 | 64 | 527 | 377 | - | 283 | 1,752 | 1,752 | - | - | 2,131 | 1,187 | - | - | - | 203,265 | 4,667 | - | |
| 2a.1.3 | Main Condensers | - | 2,801 | 109 | 62 | 705 | 533 | - | 960 | 5,170 | 5,170 | - | - | 3,800 | 1,587 | - | - | - | 271,824 | 39,151 | - | |
| Cascading Costs from Clean Building Demolition | | | | | | | | | | | | | | | | | | | | | | |
| 2a.1.4.1 | Reactor | - | 794 | - | - | - | - | - | 119 | 913 | 913 | - | - | - | - | - | - | - | - | 7,589 | - | |
| 2a.1.4.2 | Auxiliary | - | 221 | - | - | - | - | - | 33 | 254 | 254 | - | - | - | - | - | - | - | - | 1,309 | - | |
| 2a.1.4.3 | Radwaste | - | 9 | - | - | - | - | - | 1 | 10 | 10 | - | - | - | - | - | - | - | - | 65 | - | |
| 2a.1.4 | Totals | - | 1,023 | - | - | - | - | - | 154 | 1,177 | 1,177 | - | - | - | - | - | - | - | - | 8,963 | - | |
| Disposal of Plant Systems | | | | | | | | | | | | | | | | | | | | | | |
| 2a.1.5.1 | Admin Bldg Ventilation | - | 6 | - | - | - | - | - | 1 | 7 | - | - | 7 | - | - | - | - | - | - | 90 | - | |
| 2a.1.5.2 | Air Removal | - | 29 | - | - | - | - | - | 4 | 33 | - | - | 33 | - | - | - | - | - | - | 422 | - | |
| 2a.1.5.3 | Auxiliary Feedwater | - | 46 | - | - | - | - | - | 7 | 53 | - | - | 53 | - | - | - | - | - | - | 676 | - | |
| 2a.1.5.4 | Auxiliary Feedwater - RCA | - | 38 | 0 | 1 | 30 | - | - | 14 | 84 | 84 | - | - | 178 | - | - | - | - | 7,214 | 486 | - | |
| 2a.1.5.5 | Bleed Steam | - | 90 | - | - | - | - | - | 13 | 103 | - | - | 103 | - | - | - | - | - | - | 1,331 | - | |
| 2a.1.5.6 | Caustic Addition - RCA | - | 40 | 0 | 2 | 40 | - | - | 16 | 99 | 99 | - | - | 240 | - | - | - | - | 9,761 | 468 | - | |
| 2a.1.5.7 | Chemical Feed | - | 17 | - | - | - | - | - | 3 | 20 | - | - | 20 | - | - | - | - | - | - | 261 | - | |
| 2a.1.5.8 | Chemical Feed - RCA | - | 3 | 0 | 0 | 3 | - | - | 1 | 7 | 7 | - | - | 16 | - | - | - | - | 634 | 31 | - | |
| 2a.1.5.9 | Circulating Water | - | 27 | - | - | - | - | - | 4 | 32 | - | - | 32 | - | - | - | - | - | - | 401 | - | |
| 2a.1.5.10 | Condensate | - | 525 | - | - | - | - | - | 79 | 603 | - | - | 603 | - | - | - | - | - | - | 7,537 | - | |
| 2a.1.5.11 | Condensate Polishing | - | 208 | - | - | - | - | - | 31 | 239 | - | - | 239 | - | - | - | - | - | - | 2,987 | - | |
| 2a.1.5.12 | Condensate Polishing - RCA | - | 38 | 1 | 4 | 81 | - | - | 22 | 145 | 145 | - | - | 483 | - | - | - | - | 19,616 | 493 | - | |
| 2a.1.5.13 | Electro-Hydraulic | - | 10 | - | - | - | - | - | 1 | 11 | - | - | 11 | - | - | - | - | - | - | 143 | - | |
| 2a.1.5.14 | External Circulating Water | - | 26 | - | - | - | - | - | 4 | 30 | - | - | 30 | - | - | - | - | - | - | 385 | - | |
| 2a.1.5.15 | External Circulating Water - RCA | - | 72 | 1 | 5 | 121 | - | - | 37 | 237 | 237 | - | - | 721 | - | - | - | - | 29,284 | 938 | - | |
| 2a.1.5.16 | Feedwater | - | 127 | - | - | - | - | - | 19 | 146 | - | - | 146 | - | - | - | - | - | - | 1,840 | - | |
| 2a.1.5.17 | Feedwater - RCA | - | 248 | 8 | 31 | 694 | - | - | 171 | 1,152 | 1,152 | - | - | 4,147 | - | - | - | - | 168,414 | 3,377 | - | |
| 2a.1.5.18 | Gland Seal | - | 34 | - | - | - | - | - | 5 | 39 | - | - | 39 | - | - | - | - | - | - | 504 | - | |
| 2a.1.5.19 | Heater Drain | - | 384 | - | - | - | - | - | 58 | 441 | - | - | 441 | - | - | - | - | - | - | 5,638 | - | |
| 2a.1.5.20 | Hypobromous Acid Feed | - | 6 | - | - | - | - | - | 1 | 7 | - | - | 7 | - | - | - | - | - | - | 86 | - | |
| 2a.1.5.21 | Hypobromous Acid Feed - RCA | - | 1 | 0 | 0 | 0 | - | - | 0 | 2 | 2 | - | - | 2 | - | - | - | - | 100 | 12 | - | |
| 2a.1.5.22 | Internal Circ Water & CDSR | - | 25 | - | - | - | - | - | 4 | 29 | - | - | 29 | - | - | - | - | - | - | 366 | - | |
| 2a.1.5.23 | Main Gen/Exciter/Transformer | - | 0 | - | - | - | - | - | 0 | 0 | - | - | 0 | - | - | - | - | - | - | 5 | - | |
| 2a.1.5.24 | Main Steam | - | 101 | - | - | - | - | - | 15 | 116 | - | - | 116 | - | - | - | - | - | - | 1,482 | - | |
| 2a.1.5.25 | Main Steam - RCA | - | 380 | 11 | 38 | 864 | - | - | 231 | 1,525 | 1,525 | - | - | 5,166 | - | - | - | - | 209,799 | 5,146 | - | |
| 2a.1.5.26 | Repairable Spare Snubbers | - | 6 | 0 | 0 | 2 | - | - | 2 | 10 | 10 | - | - | 12 | - | - | - | - | 490 | 82 | - | |
| 2a.1.5.27 | Steam Exclusion | - | 2 | - | - | - | - | - | 0 | 2 | - | - | 2 | - | - | - | - | - | - | 32 | - | |
| 2a.1.5.28 | Steam Exclusion - RCA | - | 4 | 0 | 0 | 4 | - | - | 2 | 10 | 10 | - | - | 24 | - | - | - | - | 966 | 47 | - | |
| 2a.1.5.29 | Steam Generator Blowdown | - | 416 | 21 | 27 | 319 | 215 | - | 212 | 1,210 | 1,210 | - | - | 1,906 | 631 | - | - | - | 118,130 | 5,778 | - | |
| 2a.1.5.30 | Steam Generators | - | 5 | - | - | - | - | - | 1 | 6 | - | - | 6 | - | - | - | - | - | - | 75 | - | |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table F-2
Prairie Island DECON Unit 2
DECON Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | | |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|---------|---------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | | |
| Disposal of Plant Systems (continued) | | | | | | | | | | | | | | | | | | | | | | | |
| 2a.1.5.31 | Turbine & Moisture Separators | - | 377 | - | - | - | - | - | 57 | 434 | - | - | 434 | - | - | - | - | - | - | - | 5,472 | - | |
| 2a.1.5.32 | Turbine Oil Purification | - | 53 | - | - | - | - | - | 8 | 61 | - | - | 61 | - | - | - | - | - | - | - | 757 | - | |
| 2a.1.5.33 | Water Treatment | - | 453 | - | - | - | - | - | 68 | 521 | - | - | 521 | - | - | - | - | - | - | - | 6,677 | - | |
| 2a.1.5.34 | Water Treatment - RCA | - | 20 | 0 | 1 | 19 | - | - | 8 | 49 | 49 | - | - | 115 | - | - | - | - | - | - | 4,652 | 252 | |
| 2a.1.5 | Totals | - | 3,817 | 43 | 108 | 2,177 | 215 | - | 1,100 | 7,461 | 4,528 | - | 2,933 | 13,010 | 631 | - | - | - | - | - | 569,060 | 54,280 | |
| 2a.1.6 | Scaffolding in support of decommissioning | - | 3,020 | 22 | 10 | 188 | 30 | - | 794 | 4,064 | 4,064 | - | - | 1,012 | 89 | - | - | - | - | - | 51,216 | 26,270 | |
| 2a.1 | Subtotal Period 2a Activity Costs | 613 | 25,702 | 19,110 | 3,959 | 6,005 | 19,635 | 614 | 25,745 | 101,384 | 98,450 | - | 2,933 | 38,625 | 33,556 | 125 | 673 | - | - | - | 4,243,531 | 209,060 | 6,240 |
| Period 2a Additional Costs | | | | | | | | | | | | | | | | | | | | | | | |
| 2a.2.1 | Retired RPV upper internals package | - | 257 | 387 | 217 | - | 1,394 | - | 1,041 | 3,296 | 3,296 | - | - | - | 376 | 112 | - | - | - | - | 50,164 | 3,333 | 133 |
| 2a.2 | Subtotal Period 2a Additional Costs | - | 257 | 387 | 217 | - | 1,394 | - | 1,041 | 3,296 | 3,296 | - | - | - | 376 | 112 | - | - | - | - | 50,164 | 3,333 | 133 |
| Period 2a Collateral Costs | | | | | | | | | | | | | | | | | | | | | | | |
| 2a.3.1 | Process decommissioning water waste | 49 | - | 33 | 60 | - | 134 | - | 70 | 347 | 347 | - | - | - | 308 | - | - | - | - | - | 18,487 | 60 | - |
| 2a.3.3 | Small tool allowance | - | 269 | - | - | - | - | - | 40 | 309 | 278 | - | 31 | - | - | - | - | - | - | - | - | - | - |
| 2a.3.4 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 13,363 | 2,004 | 15,368 | - | 15,368 | - | - | - | - | - | - | - | - | - | - | - |
| 2a.3.5 | Retention and Severance | - | - | - | - | - | - | 8,215 | 1,232 | 9,447 | 9,447 | - | - | - | - | - | - | - | - | - | - | - | - |
| 2a.3.6 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 1,780 | - | 1,780 | - | 1,780 | - | - | - | - | - | - | - | - | - | - | - |
| 2a.3 | Subtotal Period 2a Collateral Costs | 49 | 269 | 33 | 60 | - | 134 | 23,358 | 3,347 | 27,250 | 10,072 | 17,147 | 31 | - | 308 | - | - | - | - | - | 18,487 | 60 | - |
| Period 2a Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | | |
| 2a.4.1 | Decon supplies | 107 | - | - | - | - | - | - | 27 | 134 | 134 | - | - | - | - | - | - | - | - | - | - | - | - |
| 2a.4.2 | Insurance | - | - | - | - | - | - | 690 | 69 | 759 | 759 | - | - | - | - | - | - | - | - | - | - | - | - |
| 2a.4.3 | Property taxes | - | - | - | - | - | - | 4,548 | 455 | 5,002 | 5,002 | - | - | - | - | - | - | - | - | - | - | - | - |
| 2a.4.4 | Health physics supplies | - | 2,103 | - | - | - | - | - | 526 | 2,629 | 2,629 | - | - | - | - | - | - | - | - | - | - | - | - |
| 2a.4.5 | Heavy equipment rental | - | 3,565 | - | - | - | - | - | 535 | 4,100 | 4,100 | - | - | - | - | - | - | - | - | - | - | - | - |
| 2a.4.6 | Disposal of DAW generated | - | - | 86 | 35 | - | 358 | - | 103 | 582 | 582 | - | - | 4,345 | - | - | - | - | - | - | 86,891 | 142 | - |
| 2a.4.7 | Plant energy budget | - | - | - | - | - | - | 2,194 | 329 | 2,523 | 2,523 | - | - | - | - | - | - | - | - | - | - | - | - |
| 2a.4.8 | NRC Fees | - | - | - | - | - | - | 526 | 53 | 578 | 578 | - | - | - | - | - | - | - | - | - | - | - | - |
| 2a.4.9 | Emergency Planning Fees | - | - | - | - | - | - | 2,647 | 265 | 2,912 | - | 2,912 | - | - | - | - | - | - | - | - | - | - | - |
| 2a.4.10 | Fixed Overhead | - | - | - | - | - | - | 1,695 | 254 | 1,949 | 1,949 | - | - | - | - | - | - | - | - | - | - | - | - |
| 2a.4.11 | Spent Fuel Pool O&M | - | - | - | - | - | - | 602 | 90 | 692 | - | 692 | - | - | - | - | - | - | - | - | - | - | - |
| 2a.4.12 | ISFSI Operating Costs | - | - | - | - | - | - | 80 | 12 | 92 | - | 92 | - | - | - | - | - | - | - | - | - | - | - |
| 2a.4.13 | Railroad Track Maintenance | - | - | - | - | - | - | 318 | 48 | 366 | 366 | - | - | - | - | - | - | - | - | - | - | - | - |
| 2a.4.14 | Remedial Actions Surveys | - | - | - | - | - | - | 1,596 | 239 | 1,835 | 1,835 | - | - | - | - | - | - | - | - | - | - | - | - |
| 2a.4.15 | Security Staff Cost | - | - | - | - | - | - | 10,900 | 1,635 | 12,534 | 12,534 | - | - | - | - | - | - | - | - | - | - | - | 160,018 |
| 2a.4.16 | DOC Staff Cost | - | - | - | - | - | - | 20,663 | 3,099 | 23,763 | 23,763 | - | - | - | - | - | - | - | - | - | - | - | 225,210 |
| 2a.4.17 | Utility Staff Cost | - | - | - | - | - | - | 27,056 | 4,058 | 31,115 | 31,115 | - | - | - | - | - | - | - | - | - | - | - | 419,049 |
| 2a.4 | Subtotal Period 2a Period-Dependent Costs | 107 | 5,668 | 86 | 35 | - | 358 | 73,514 | 11,797 | 91,565 | 87,870 | 3,696 | - | - | 4,345 | - | - | - | - | - | 86,891 | 142 | 804,276 |
| 2a.0 | TOTAL PERIOD 2a COST | 770 | 31,895 | 19,616 | 4,270 | 6,005 | 21,522 | 97,486 | 41,931 | 223,495 | 199,687 | 20,843 | 2,964 | 38,625 | 38,584 | 237 | 673 | - | - | - | 4,399,073 | 212,595 | 810,649 |
| PERIOD 2b - Site Decontamination | | | | | | | | | | | | | | | | | | | | | | | |
| Period 2b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | | |
| Disposal of Plant Systems | | | | | | | | | | | | | | | | | | | | | | | |
| 2b.1.1.1 | ADT & Misc Ventilation | - | 25 | 1 | 1 | 26 | 3 | - | 11 | 66 | 66 | - | - | 153 | 9 | - | - | - | - | - | 6,803 | 363 | - |
| 2b.1.1.2 | Aux Bldg Normal Ventilation | - | 69 | 2 | 6 | 116 | 13 | - | 39 | 246 | 246 | - | - | 692 | 39 | - | - | - | - | - | 30,595 | 1,013 | - |
| 2b.1.1.3 | Aux Bldg Special Ventilation | - | 14 | 0 | 1 | 12 | 2 | - | 6 | 34 | 34 | - | - | 70 | 6 | - | - | - | - | - | 3,234 | 197 | - |
| 2b.1.1.4 | Battery Rm Special Ventilation | - | 2 | - | - | - | - | - | 0 | 2 | - | - | 2 | - | - | - | - | - | - | - | - | 24 | - |
| 2b.1.1.5 | Boron Recycle | 0 | 4 | 0 | 0 | 0 | 3 | - | 2 | 10 | 10 | - | - | 3 | 9 | - | - | - | - | - | 700 | 50 | - |
| 2b.1.1.6 | Chemical & Volume Control | 749 | 942 | 62 | 57 | 394 | 677 | - | 853 | 3,736 | 3,736 | - | - | 2,356 | 1,977 | - | - | - | - | - | 223,753 | 23,197 | - |
| 2b.1.1.7 | Cold Chemical Lab Ventilation | - | 1 | - | - | - | - | - | 0 | 1 | - | - | 1 | - | - | - | - | - | - | - | - | 9 | - |
| 2b.1.1.8 | Component Cooling - RCA | - | 647 | 25 | 88 | 2,007 | - | - | 479 | 3,246 | 3,246 | - | - | 11,996 | - | - | - | - | - | - | 487,169 | 8,583 | - |
| 2b.1.1.9 | Containment Cooling | - | 35 | - | - | - | - | - | 5 | 40 | - | - | 40 | - | - | - | - | - | - | - | - | 502 | - |
| 2b.1.1.10 | Containment Cooling - RCA | - | 302 | 6 | 20 | 459 | - | - | 148 | 934 | 934 | - | - | 2,743 | - | - | - | - | - | - | 111,390 | 3,949 | - |
| 2b.1.1.11 | Containment Hydrogen Control - RCA | - | 36 | 0 | 1 | 24 | - | - | 13 | 74 | 74 | - | - | 141 | - | - | - | - | - | - | 5,742 | 494 | - |
| 2b.1.1.12 | Containment Spray - RCA | - | 194 | 3 | 11 | 243 | - | - | 87 | 538 | 538 | - | - | 1,453 | - | - | - | - | - | - | 59,019 | 2,617 | - |
| 2b.1.1.13 | Containment Ventilation | - | 235 | 23 | 49 | 790 | 243 | - | 248 | 1,587 | 1,587 | - | - | 4,721 | 722 | - | - | - | - | - | 237,643 | 3,375 | - |
| 2b.1.1.14 | Control/Relay/Cmpt Rm Vent | - | 31 | 1 | 2 | 44 | 7 | - | 17 | 102 | 102 | - | - | 260 | 20 | - | - | - | - | - | 11,878 | 454 | - |
| 2b.1.1.15 | Cooling Water | - | 159 | - | - | - | - | - | 24 | 183 | - | - | 183 | - | - | - | - | - | - | - | - | 2,344 | - |
| 2b.1.1.16 | Cooling Water - RCA | - | 476 | 17 | 62 | 1,412 | - | - | 342 | 2,310 | 2,310 | - | - | 8,442 | - | - | - | - | - | - | 342,822 | 6,311 | - |
| 2b.1.1.17 | Cranes/Hoists/Elevators - RCA | - | 3 | 0 | 1 | 17 | - | - | 4 | 25 | 25 | - | - | 103 | - | - | - | - | - | - | 4,184 | 48 | - |
| 2b.1.1.18 | D3 Emergency Diesel | - | 10 | - | - | - | - | - | 2 | 12 | - | - | 12 | - | - | - | - | - | - | - | - | 141 | - |
| 2b.1.1.19 | D4 Emergency Diesel | - | 10 | - | - | - | - | - | 2 | 12 | - | - | 12 | - | - | - | - | - | - | - | - | 141 | - |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table F-2
Prairie Island DECON Unit 2
DECON Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|---------------------------------------|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|-------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| Disposal of Plant Systems (continued) | | | | | | | | | | | | | | | | | | | | | | |
| 2b.1.1.20 | D5 Emergency Diesel | - | 0 | - | - | - | - | - | 0 | 0 | - | - | 0 | - | - | - | - | - | - | - | 5 | - |
| 2b.1.1.21 | Electrical - Clean | - | 1,714 | - | - | - | - | - | 257 | 1,972 | - | - | 1,972 | - | - | - | - | - | - | - | 24,276 | - |
| 2b.1.1.22 | Electrical - Contaminated | - | 475 | 5 | 16 | 334 | 25 | - | 178 | 1,034 | 1,034 | - | - | 1,997 | 75 | - | - | - | - | 85,887 | 6,503 | - |
| 2b.1.1.23 | Electrical - Decontaminated | - | 2,955 | 38 | 138 | 3,138 | - | - | 1,234 | 7,503 | 7,503 | - | - | 18,753 | - | - | - | - | - | 761,569 | 38,423 | - |
| 2b.1.1.24 | Filter Rm Ventilation | - | 5 | 0 | 0 | 4 | 0 | - | 2 | 11 | 11 | - | - | 24 | 1 | - | - | - | - | 1,017 | 69 | - |
| 2b.1.1.25 | Fire Protection & Detection | - | 204 | - | - | - | - | - | 31 | 235 | - | - | 235 | - | - | - | - | - | - | - | 3,009 | - |
| 2b.1.1.26 | Fire Protection & Detection - RCA | - | 246 | 4 | 13 | 306 | - | - | 110 | 679 | 679 | - | - | 1,828 | - | - | - | - | - | 74,245 | 3,134 | - |
| 2b.1.1.27 | Fuel Handling | - | 74 | 1 | 2 | 34 | 17 | - | 28 | 156 | 156 | - | - | 200 | 49 | - | - | - | - | 11,273 | 1,101 | - |
| 2b.1.1.28 | Fuel Oil | - | 1 | - | - | - | - | - | 0 | 1 | - | - | 1 | - | - | - | - | - | - | - | 9 | - |
| 2b.1.1.29 | HVAC - Clean | - | 151 | - | - | - | - | - | 23 | 174 | - | - | 174 | - | - | - | - | - | - | - | 2,373 | - |
| 2b.1.1.30 | HVAC - Contaminated | - | 1,231 | 29 | 87 | 1,798 | 136 | - | 627 | 3,908 | 3,908 | - | - | 10,745 | 405 | - | - | - | - | 462,103 | 16,579 | - |
| 2b.1.1.31 | Heating | - | 322 | - | - | - | - | - | 48 | 370 | - | - | 370 | - | - | - | - | - | - | - | 4,804 | - |
| 2b.1.1.32 | Heating - RCA | - | 337 | 4 | 14 | 319 | - | - | 135 | 809 | 809 | - | - | 1,907 | - | - | - | - | - | 77,458 | 4,086 | - |
| 2b.1.1.33 | Hot Lab & Sample Rm Ventilation | - | 20 | 0 | 1 | 18 | 1 | - | 8 | 48 | 48 | - | - | 107 | 4 | - | - | - | - | 4,622 | 285 | - |
| 2b.1.1.34 | Incore Instrumentation | 0 | 30 | 1 | 2 | 10 | 20 | - | 14 | 77 | 77 | - | - | 60 | 58 | - | - | - | - | 6,143 | 458 | - |
| 2b.1.1.35 | Misc Drains & Vents | - | 234 | 12 | 12 | 77 | 145 | - | 109 | 590 | 590 | - | - | 458 | 426 | - | - | - | - | 46,079 | 3,180 | - |
| 2b.1.1.36 | Misc Lab & Service Areas Vent | - | 129 | 8 | 8 | 62 | 84 | - | 65 | 356 | 356 | - | - | 370 | 244 | - | - | - | - | 30,899 | 1,713 | - |
| 2b.1.1.37 | Miscellaneous Gas | - | 72 | - | - | - | - | - | 11 | 83 | - | - | 83 | - | - | - | - | - | - | - | 1,073 | - |
| 2b.1.1.38 | Miscellaneous Gas - RCA | - | 134 | 1 | 4 | 100 | - | - | 49 | 289 | 289 | - | - | 600 | - | - | - | - | - | 24,378 | 1,636 | - |
| 2b.1.1.39 | Radiation Monitoring | - | 7 | - | - | - | - | - | 1 | 9 | - | - | 9 | - | - | - | - | - | - | - | 111 | - |
| 2b.1.1.40 | Radiation Monitoring - RCA | - | 65 | 1 | 2 | 53 | - | - | 25 | 145 | 145 | - | - | 316 | - | - | - | - | - | 12,826 | 782 | - |
| 2b.1.1.41 | Reactor Coolant | 163 | 236 | 20 | 16 | 38 | 249 | - | 213 | 937 | 937 | - | - | 229 | 730 | - | - | - | - | 56,440 | 5,517 | - |
| 2b.1.1.42 | Reactor Hot Sampling | 140 | 126 | 11 | 7 | 9 | 108 | - | 132 | 533 | 533 | - | - | 54 | 312 | - | - | - | - | 22,678 | 3,686 | - |
| 2b.1.1.43 | Reactor Makeup | - | 41 | - | - | - | - | - | 6 | 47 | - | - | 47 | - | - | - | - | - | - | - | 583 | - |
| 2b.1.1.44 | Reactor Makeup - RCA | - | 4 | 0 | 0 | 5 | - | - | 2 | 11 | 11 | - | - | 28 | - | - | - | - | - | - | 1,148 | 47 |
| 2b.1.1.45 | Reactor Vessel | 9 | 18 | 1 | 0 | 4 | 5 | - | 11 | 47 | 47 | - | - | 22 | 14 | - | - | - | - | 1,816 | 385 | - |
| 2b.1.1.46 | Residual Heat Removal | 348 | 393 | 84 | 86 | 477 | 1,102 | - | 641 | 3,132 | 3,132 | - | - | 2,853 | 3,244 | - | - | - | - | 324,232 | 7,112 | - |
| 2b.1.1.47 | Safeguards Chilled Water | - | 5 | - | - | - | - | - | 1 | 6 | - | - | 6 | - | - | - | - | - | - | - | 75 | - |
| 2b.1.1.48 | Safety Injection | - | 874 | 42 | 72 | 1,117 | 395 | - | 500 | 3,000 | 3,000 | - | - | 6,676 | 1,161 | - | - | - | - | 345,708 | 12,284 | - |
| 2b.1.1.49 | Sampling | - | 52 | 3 | 2 | 6 | 32 | - | 23 | 119 | 119 | - | - | 37 | 93 | - | - | - | - | 7,628 | 714 | - |
| 2b.1.1.50 | Service Bldg & New Cmpt Vent | - | 0 | - | - | - | - | - | 0 | 0 | - | - | 0 | - | - | - | - | - | - | - | 6 | - |
| 2b.1.1.51 | Shield Bldg Ventilation | - | 120 | 13 | 25 | 339 | 163 | - | 127 | 787 | 787 | - | - | 2,028 | 484 | - | - | - | - | 113,139 | 1,743 | - |
| 2b.1.1.52 | Station & Instrument Air | - | 161 | - | - | - | - | - | 24 | 185 | - | - | 185 | - | - | - | - | - | - | - | 2,424 | - |
| 2b.1.1.53 | Station & Instrument Air - RCA | - | 299 | 3 | 12 | 272 | - | - | 118 | 704 | 704 | - | - | 1,625 | - | - | - | - | - | 65,986 | 3,638 | - |
| 2b.1.1.54 | Turbine Bldg Traps & Drains | - | 30 | - | - | - | - | - | 5 | 35 | - | - | 35 | - | - | - | - | - | - | - | 462 | - |
| 2b.1.1.55 | Turbine Bldg Traps & Drains - RCA | - | 30 | 0 | 1 | 30 | - | - | 12 | 73 | 73 | - | - | 180 | - | - | - | - | - | 7,321 | 344 | - |
| 2b.1.1.56 | Turbine Bldg Ventilation | - | 46 | - | - | - | - | - | 7 | 53 | - | - | 53 | - | - | - | - | - | - | - | 655 | - |
| 2b.1.1.57 | Unit Coolers | - | 23 | - | - | - | - | - | 3 | 26 | - | - | 26 | - | - | - | - | - | - | - | 332 | - |
| 2b.1.1.58 | Unit Coolers - RCA | - | 56 | 0 | 2 | 39 | - | - | 20 | 117 | 117 | - | - | 232 | - | - | - | - | - | 9,413 | 690 | - |
| 2b.1.1.59 | Waste Gas Disposal | 553 | 479 | 43 | 45 | 410 | 464 | - | 585 | 2,581 | 2,581 | - | - | 2,453 | 1,358 | - | - | - | - | 187,339 | 14,308 | - |
| 2b.1.1.60 | Waste Liquid Disposal | 1,436 | 1,800 | 116 | 100 | 612 | 1,234 | - | 1,595 | 6,893 | 6,893 | - | - | 3,655 | 3,594 | - | - | - | - | 381,754 | 44,485 | - |
| 2b.1.1.61 | Waste Solid Disposal | 115 | 145 | 12 | 11 | 65 | 134 | - | 140 | 622 | 622 | - | - | 389 | 393 | - | - | - | - | 41,177 | 3,481 | - |
| 2b.1.1 | Totals | 3,515 | 16,542 | 596 | 980 | 15,220 | 5,264 | - | 9,399 | 51,516 | 48,072 | - | 3,444 | 90,963 | 15,429 | - | - | - | - | 4,689,210 | 270,390 | - |
| 2b.1.2 | Scaffolding in support of decommissioning | - | 3,775 | 27 | 13 | 235 | 37 | - | 993 | 5,081 | 5,081 | - | - | 1,265 | 112 | - | - | - | - | 64,020 | 32,837 | - |
| Decontamination of Site Buildings | | | | | | | | | | | | | | | | | | | | | | |
| 2b.1.3.1 | Reactor | 1,215 | 2,808 | 240 | 1,236 | 373 | 13,625 | - | 4,981 | 24,479 | 24,479 | - | - | 2,230 | 83,434 | - | - | - | - | 3,633,771 | 50,962 | - |
| 2b.1.3.2 | Auxiliary | 1,292 | 422 | 23 | 117 | 177 | 648 | - | 960 | 3,639 | 3,639 | - | - | 1,060 | 6,118 | - | - | - | - | 332,495 | 23,821 | - |
| 2b.1.3.3 | Backwash Waste Receiving Tank | - | 28 | 3 | 17 | - | 97 | - | 34 | 179 | 179 | - | - | - | 929 | - | - | - | - | 43,896 | 301 | - |
| 2b.1.3.4 | Drum Transfer & Truck Loading Enclosure | 18 | 9 | 1 | 3 | 3 | 14 | - | 16 | 63 | 63 | - | - | 19 | 135 | - | - | - | - | 7,118 | 369 | - |
| 2b.1.3.5 | LLRW Storage Enclosure | 123 | 54 | 3 | 17 | 6 | 96 | - | 103 | 403 | 403 | - | - | 38 | 920 | - | - | - | - | 44,971 | 2,426 | - |
| 2b.1.3.6 | Radwaste | 55 | 24 | 1 | 8 | 7 | 43 | - | 47 | 185 | 185 | - | - | 42 | 412 | - | - | - | - | 21,136 | 1,083 | - |
| 2b.1.3.7 | Resin Disposal | 16 | 12 | 1 | 3 | 14 | 14 | - | 17 | 76 | 76 | - | - | 83 | 124 | - | - | - | - | 9,271 | 383 | - |
| 2b.1.3 | Totals | 2,720 | 3,357 | 271 | 1,400 | 581 | 14,537 | - | 6,158 | 29,024 | 29,024 | - | - | 3,471 | 92,071 | - | - | - | - | 4,092,658 | 79,343 | - |
| 2b.1.4 | Prepare/submit License Termination Plan | - | - | - | - | - | - | 225 | 34 | 259 | 259 | - | - | - | - | - | - | - | - | - | - | 1,751 |
| 2b.1.5 | Receive NRC approval of termination plan | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - | - |
| 2b.1 | Subtotal Period 2b Activity Costs | 6,235 | 23,674 | 895 | 2,393 | 16,035 | 19,839 | 225 | 16,584 | 85,879 | 82,435 | - | 3,444 | 95,700 | 107,611 | - | - | - | - | 8,845,887 | 382,570 | 1,751 |
| Period 2b Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 2b.2.1 | Operational Equipment | - | - | 11 | 36 | 606 | - | - | 97 | 751 | 751 | - | - | 5,880 | - | - | - | - | - | 147,000 | 16 | - |
| 2b.2.2 | Excavation of Underground Services | - | 1,175 | - | - | - | - | 225 | 328 | 1,728 | 1,728 | - | - | - | - | - | - | - | - | - | 7,411 | - |
| 2b.2.3 | Security Modifications | - | - | - | - | - | - | 4,348 | 652 | 5,000 | 5,000 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.2 | Subtotal Period 2b Additional Costs | - | 1,175 | 11 | 36 | 606 | - | 4,573 | 1,077 | 7,478 | 7,478 | - | - | 5,880 | - | - | - | - | - | 147,000 | 7,427 | - |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table F-2
Prairie Island DECON Unit 2
DECON Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| Period 2b Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 2b.3.1 | Process decommissioning water waste | 166 | - | 113 | 203 | - | 456 | - | 239 | 1,176 | 1,176 | - | - | - | 1,047 | - | - | - | 62,844 | 204 | - |
| 2b.3.2 | Process decommissioning chemical flush waste | 3 | - | 119 | 390 | - | 893 | - | 295 | 1,699 | 1,699 | - | - | - | 1,154 | - | - | - | 122,948 | 216 | - |
| 2b.3.3 | Small tool allowance | - | 446 | - | - | - | - | - | 67 | 513 | 513 | - | - | - | - | - | - | - | - | - | - |
| 2b.3.4 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 51,308 | 7,696 | 59,005 | - | 59,005 | - | - | - | - | - | - | - | - | - |
| 2b.3.5 | Retention and Severance | - | - | - | - | - | - | 2,839 | 426 | 3,265 | 3,265 | - | - | - | - | - | - | - | - | - | - |
| 2b.3.6 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 1,348 | - | 1,348 | - | 1,348 | - | - | - | - | - | - | - | - | - |
| 2b.3.7 | On-site survey and release of 0.437 tons clean metallic waste | - | - | - | - | - | - | 1 | 0 | 1 | 1 | - | - | - | - | - | - | - | - | - | - |
| 2b.3 | Subtotal Period 2b Collateral Costs | 169 | 446 | 232 | 592 | - | 1,349 | 55,497 | 8,723 | 67,007 | 6,654 | 60,353 | - | - | 2,201 | - | - | - | 185,792 | 420 | - |
| Period 2b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 2b.4.1 | Decon supplies | 1,219 | - | - | - | - | - | - | 305 | 1,524 | 1,524 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.2 | Insurance | - | - | - | - | - | - | 523 | 52 | 575 | 575 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.3 | Property taxes | - | - | - | - | - | - | 3,075 | 308 | 3,383 | 3,383 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.4 | Health physics supplies | - | 2,866 | - | - | - | - | - | 716 | 3,582 | 3,582 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.5 | Heavy equipment rental | - | 2,774 | - | - | - | - | - | 416 | 3,190 | 3,190 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.6 | Disposal of DAW generated | - | - | 103 | 42 | - | 429 | - | 124 | 698 | 698 | - | - | - | 5,209 | - | - | - | 104,172 | 170 | - |
| 2b.4.7 | Plant energy budget | - | - | - | - | - | - | 1,313 | 197 | 1,509 | 1,509 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.8 | NRC Fees | - | - | - | - | - | - | 398 | 40 | 438 | 438 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.9 | Emergency Planning Fees | - | - | - | - | - | - | 2,006 | 201 | 2,207 | - | 2,207 | - | - | - | - | - | - | - | - | - |
| 2b.4.10 | Fixed Overhead | - | - | - | - | - | - | 1,284 | 193 | 1,477 | 1,477 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.11 | Spent Fuel Pool O&M | - | - | - | - | - | - | 456 | 68 | 524 | - | 524 | - | - | - | - | - | - | - | - | - |
| 2b.4.12 | Liquid Radwaste Processing Equipment/Services | - | - | - | - | - | - | 229 | 34 | 264 | 264 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.13 | ISFSI Operating Costs | - | - | - | - | - | - | 60 | 9 | 69 | - | 69 | - | - | - | - | - | - | - | - | - |
| 2b.4.14 | Railroad Track Maintenance | - | - | - | - | - | - | 67 | 10 | 78 | 78 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.15 | Remedial Actions Surveys | - | - | - | - | - | - | 1,209 | 181 | 1,391 | 1,391 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.16 | Security Staff Cost | - | - | - | - | - | - | 8,259 | 1,239 | 9,497 | 9,497 | - | - | - | - | - | - | - | - | - | 121,244 |
| 2b.4.17 | DOC Staff Cost | - | - | - | - | - | - | 15,117 | 2,268 | 17,385 | 17,385 | - | - | - | - | - | - | - | - | - | 163,904 |
| 2b.4.18 | Utility Staff Cost | - | - | - | - | - | - | 19,642 | 2,946 | 22,588 | 22,588 | - | - | - | - | - | - | - | - | - | 304,233 |
| 2b.4 | Subtotal Period 2b Period-Dependent Costs | 1,219 | 5,640 | 103 | 42 | - | 429 | 53,639 | 9,307 | 70,380 | 67,579 | 2,800 | - | - | 5,209 | - | - | - | 104,172 | 170 | 589,381 |
| 2b.0 | TOTAL PERIOD 2b COST | 7,623 | 30,935 | 1,242 | 3,063 | 16,641 | 21,617 | 113,934 | 35,690 | 230,744 | 164,147 | 63,153 | 3,444 | 101,580 | 115,021 | - | - | - | 9,282,851 | 390,587 | 591,132 |
| PERIOD 2d - Decontamination Following Wet Fuel Storage | | | | | | | | | | | | | | | | | | | | | |
| Period 2d Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| 2d.1.1 | Remove spent fuel racks | 347 | 35 | 86 | 41 | - | 703 | - | 373 | 1,585 | 1,585 | - | - | - | 2,092 | - | - | - | 132,919 | 576 | - |
| Disposal of Plant Systems | | | | | | | | | | | | | | | | | | | | | |
| 2d.1.2.1 | Electrical - Contaminated - Fuel Pool | - | 203 | 2 | 7 | 145 | 11 | - | 77 | 445 | 445 | - | - | 864 | 33 | - | - | - | 37,167 | 2,783 | - |
| 2d.1.2.2 | Electrical - Decontaminated - Fuel Pool | - | 1,269 | 17 | 59 | 1,350 | - | - | 530 | 3,225 | 3,225 | - | - | 8,069 | - | - | - | - | 327,668 | 16,495 | - |
| 2d.1.2.3 | Fire Protection & Detection - RCA Fuel P | - | 37 | 1 | 2 | 48 | - | - | 17 | 105 | 105 | - | - | 286 | - | - | - | - | 11,622 | 476 | - |
| 2d.1.2.4 | HVAC - Contaminated - Fuel Pool | - | 553 | 13 | 39 | 808 | 61 | - | 282 | 1,756 | 1,756 | - | - | 4,828 | 182 | - | - | - | 207,612 | 7,448 | - |
| 2d.1.2.5 | Safeguards Chilled Water - RCA | - | 5 | 0 | 0 | 4 | - | - | 2 | 11 | 11 | - | - | 26 | - | - | - | - | 1,045 | 51 | - |
| 2d.1.2.6 | Spent Fuel Pool Cooling | 32 | 36 | 3 | 2 | 6 | 37 | - | 36 | 152 | 152 | - | - | 39 | 107 | - | - | - | 8,481 | 882 | - |
| 2d.1.2.7 | Spent Fuel Pool Normal Ventilation | - | 27 | 1 | 2 | 44 | 4 | - | 15 | 93 | 93 | - | - | 265 | 12 | - | - | - | 11,505 | 394 | - |
| 2d.1.2 | Totals | 32 | 2,130 | 36 | 112 | 2,405 | 113 | - | 958 | 5,786 | 5,786 | - | - | 14,376 | 333 | - | - | - | 605,100 | 28,530 | - |
| Decontamination of Site Buildings | | | | | | | | | | | | | | | | | | | | | |
| 2d.1.3.1 | Fuel Handling of Aux Building | 1,029 | 1,138 | 13 | 45 | 404 | 195 | - | 916 | 3,741 | 3,741 | - | - | 2,417 | 1,652 | - | - | - | 177,755 | 30,404 | - |
| 2d.1.3 | Totals | 1,029 | 1,138 | 13 | 45 | 404 | 195 | - | 916 | 3,741 | 3,741 | - | - | 2,417 | 1,652 | - | - | - | 177,755 | 30,404 | - |
| 2d.1.4 | Scaffolding in support of decommissioning | - | 755 | 5 | 3 | 47 | 7 | - | 199 | 1,016 | 1,016 | - | - | 253 | 22 | - | - | - | 12,804 | 6,567 | - |
| 2d.1 | Subtotal Period 2d Activity Costs | 1,408 | 4,058 | 141 | 202 | 2,857 | 1,018 | - | 2,445 | 12,128 | 12,128 | - | - | 17,046 | 4,099 | - | - | - | 928,579 | 66,078 | - |
| Period 2d Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 2d.2.1 | License Termination Survey Planning | - | - | - | - | - | - | 1,037 | 311 | 1,348 | 1,348 | - | - | - | - | - | - | - | - | - | 6,240 |
| 2d.2 | Subtotal Period 2d Additional Costs | - | - | - | - | - | - | 1,037 | 311 | 1,348 | 1,348 | - | - | - | - | - | - | - | - | - | 6,240 |
| Period 2d Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 2d.3.1 | Process decommissioning water waste | 45 | - | 31 | 56 | - | 126 | - | 65 | 323 | 323 | - | - | - | 288 | - | - | - | 17,293 | 56 | - |
| 2d.3.2 | Process decommissioning chemical flush waste | 0 | - | 1 | 5 | - | 10 | - | 3 | 20 | 20 | - | - | - | 13 | - | - | - | 1,422 | 2 | - |
| 2d.3.3 | Small tool allowance | - | 83 | - | - | - | - | - | 12 | 95 | 95 | - | - | - | - | - | - | - | - | - | - |
| 2d.3.4 | Decommissioning Equipment Disposition | - | - | 130 | 67 | 1,112 | 178 | - | 234 | 1,722 | 1,722 | - | - | 6,000 | 529 | - | - | - | 303,608 | 147 | - |
| 2d.3.5 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 975 | - | 975 | - | 975 | - | - | - | - | - | - | - | - | - |
| 2d.3 | Subtotal Period 2d Collateral Costs | 45 | 83 | 162 | 128 | 1,112 | 314 | 975 | 316 | 3,135 | 2,160 | 975 | - | 6,000 | 831 | - | - | - | 322,324 | 206 | - |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table F-2
Prairie Island DECON Unit 2
DECON Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|---|---------------|---------------|-----------------|-----------------|---------------------------|---------------------|----------------|-------------------|----------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| Period 2d Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 2d.4.1 | Decon supplies | 236 | - | - | - | - | - | - | 59 | 295 | 295 | - | - | - | - | - | - | - | - | - | - |
| 2d.4.2 | Insurance | - | - | - | - | - | - | 378 | 38 | 416 | 416 | - | - | - | - | - | - | - | - | - | - |
| 2d.4.3 | Property taxes | - | - | - | - | - | - | 2,004 | 200 | 2,204 | 2,204 | - | - | - | - | - | - | - | - | - | - |
| 2d.4.4 | Health physics supplies | - | 794 | - | - | - | - | - | 198 | 992 | 992 | - | - | - | - | - | - | - | - | - | - |
| 2d.4.5 | Heavy equipment rental | - | 2,007 | - | - | - | - | - | 301 | 2,308 | 2,308 | - | - | - | - | - | - | - | - | - | - |
| 2d.4.6 | Disposal of DAW generated | - | - | 40 | 16 | - | 165 | - | 48 | 268 | 268 | - | - | - | 2,002 | - | - | - | 40,031 | 65 | - |
| 2d.4.7 | Plant energy budget | - | - | - | - | - | - | 506 | 76 | 582 | 582 | - | - | - | - | - | - | - | - | - | - |
| 2d.4.8 | NRC Fees | - | - | - | - | - | - | 277 | 28 | 305 | 305 | - | - | - | - | - | - | - | - | - | - |
| 2d.4.9 | Emergency Planning Fees | - | - | - | - | - | - | 58 | 6 | 64 | - | 64 | - | - | - | - | - | - | - | - | - |
| 2d.4.10 | Fixed Overhead | - | - | - | - | - | - | 929 | 139 | 1,068 | 1,068 | - | - | - | - | - | - | - | - | - | - |
| 2d.4.11 | Liquid Radwaste Processing Equipment/Services | - | - | - | - | - | - | 332 | 50 | 381 | 381 | - | - | - | - | - | - | - | - | - | - |
| 2d.4.12 | ISFSI Operating Costs | - | - | - | - | - | - | 44 | 7 | 50 | - | 50 | - | - | - | - | - | - | - | - | - |
| 2d.4.13 | Railroad Track Maintenance | - | - | - | - | - | - | 49 | 7 | 56 | 56 | - | - | - | - | - | - | - | - | - | - |
| 2d.4.14 | Remedial Actions Surveys | - | - | - | - | - | - | 875 | 131 | 1,006 | 1,006 | - | - | - | - | - | - | - | - | - | - |
| 2d.4.15 | Security Staff Cost | - | - | - | - | - | - | 5,782 | 867 | 6,649 | 4,694 | 1,955 | - | - | - | - | - | - | - | - | 84,454 |
| 2d.4.16 | DOC Staff Cost | - | - | - | - | - | - | 6,401 | 960 | 7,361 | 7,361 | - | - | - | - | - | - | - | - | - | 70,243 |
| 2d.4.17 | Utility Staff Cost | - | - | - | - | - | - | 8,100 | 1,215 | 9,315 | 8,858 | 456 | - | - | - | - | - | - | - | - | 126,681 |
| 2d.4 | Subtotal Period 2d Period-Dependent Costs | 236 | 2,801 | 40 | 16 | - | 165 | - | 4,330 | 33,321 | 30,796 | 2,525 | - | - | 2,002 | - | - | - | 40,031 | 65 | 281,377 |
| 2d.0 | TOTAL PERIOD 2d COST | 1,689 | 6,941 | 343 | 346 | 3,969 | 1,496 | 27,746 | 7,403 | 49,932 | 46,432 | 3,501 | - | 23,046 | 6,931 | - | - | - | 1,290,933 | 66,348 | 287,617 |
| PERIOD 2f - License Termination | | | | | | | | | | | | | | | | | | | | | |
| Period 2f Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| 2f.1.1 | ORISE confirmatory survey | - | - | - | - | - | - | 166 | 50 | 216 | 216 | - | - | - | - | - | - | - | - | - | - |
| 2f.1.2 | Terminate license | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 2f.1 | Subtotal Period 2f Activity Costs | - | - | - | - | - | - | 166 | 50 | 216 | 216 | - | - | - | - | - | - | - | - | - | - |
| Period 2f Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 2f.2.1 | License Termination Survey | - | - | - | - | - | - | 7,041 | 2,112 | 9,154 | 9,154 | - | - | - | - | - | - | - | - | 100,895 | 3,120 |
| 2f.2 | Subtotal Period 2f Additional Costs | - | - | - | - | - | - | 7,041 | 2,112 | 9,154 | 9,154 | - | - | - | - | - | - | - | - | 100,895 | 3,120 |
| Period 2f Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 2f.3.1 | DOC staff relocation expenses | - | - | - | - | - | - | 1,264 | 190 | 1,454 | 1,454 | - | - | - | - | - | - | - | - | - | - |
| 2f.3.2 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 934 | - | 934 | - | 934 | - | - | - | - | - | - | - | - | - |
| 2f.3 | Subtotal Period 2f Collateral Costs | - | - | - | - | - | - | 2,198 | 190 | 2,388 | 1,454 | 934 | - | - | - | - | - | - | - | - | - |
| Period 2f Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 2f.4.1 | Insurance | - | - | - | - | - | - | 362 | 36 | 398 | 398 | - | - | - | - | - | - | - | - | - | - |
| 2f.4.2 | Property taxes | - | - | - | - | - | - | 1,771 | 177 | 1,948 | 1,948 | - | - | - | - | - | - | - | - | - | - |
| 2f.4.3 | Health physics supplies | - | 710 | - | - | - | - | - | 178 | 888 | 888 | - | - | - | - | - | - | - | - | - | - |
| 2f.4.4 | Disposal of DAW generated | - | - | 7 | 3 | - | 28 | - | 8 | 45 | 45 | - | - | - | 334 | - | - | - | 6,685 | 11 | - |
| 2f.4.5 | Plant energy budget | - | - | - | - | - | - | 243 | 36 | 279 | 279 | - | - | - | - | - | - | - | - | - | - |
| 2f.4.6 | NRC Fees | - | - | - | - | - | - | 263 | 26 | 290 | 290 | - | - | - | - | - | - | - | - | - | - |
| 2f.4.7 | Emergency Planning Fees | - | - | - | - | - | - | 55 | 6 | 61 | - | 61 | - | - | - | - | - | - | - | - | - |
| 2f.4.8 | Fixed Overhead | - | - | - | - | - | - | 890 | 133 | 1,023 | 1,023 | - | - | - | - | - | - | - | - | - | - |
| 2f.4.9 | ISFSI Operating Costs | - | - | - | - | - | - | 42 | 6 | 48 | - | 48 | - | - | - | - | - | - | - | - | - |
| 2f.4.10 | Railroad Track Maintenance | - | - | - | - | - | - | 47 | 7 | 54 | 54 | - | - | - | - | - | - | - | - | - | - |
| 2f.4.11 | Security Staff Cost | - | - | - | - | - | - | 5,538 | 831 | 6,369 | 4,497 | 1,873 | - | - | - | - | - | - | - | - | 80,898 |
| 2f.4.12 | DOC Staff Cost | - | - | - | - | - | - | 4,238 | 636 | 4,874 | 4,874 | - | - | - | - | - | - | - | - | - | 46,283 |
| 2f.4.13 | Utility Staff Cost | - | - | - | - | - | - | 4,011 | 602 | 4,613 | 4,175 | 438 | - | - | - | - | - | - | - | - | 59,507 |
| 2f.4 | Subtotal Period 2f Period-Dependent Costs | - | 710 | 7 | 3 | - | 28 | 17,461 | 2,682 | 20,890 | 18,470 | 2,420 | - | - | 334 | - | - | - | 6,685 | 11 | 186,687 |
| 2f.0 | TOTAL PERIOD 2f COST | - | 710 | 7 | 3 | - | 28 | 26,867 | 5,034 | 32,648 | 29,294 | 3,354 | - | - | 334 | - | - | - | 6,685 | 100,906 | 189,807 |
| PERIOD 2 TOTALS | | 10,081 | 70,482 | 21,208 | 7,682 | 26,615 | 44,663 | 266,032 | 90,058 | 536,819 | 439,560 | 90,851 | 6,408 | 163,252 | 160,871 | 237 | 673 | - | 14,979,540 | 770,436 | 1,879,206 |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table F-2
Prairie Island DECON Unit 2
DECON Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|---------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| PERIOD 3b - Site Restoration | | | | | | | | | | | | | | | | | | | | | | |
| Period 3b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Demolition of Remaining Site Buildings | | | | | | | | | | | | | | | | | | | | | | |
| 3b.1.1.1 | Reactor | - | 4,645 | - | - | - | - | - | 697 | 5,342 | - | - | 5,342 | - | - | - | - | - | - | - | 44,679 | - |
| 3b.1.1.2 | Auxiliary | - | 1,993 | - | - | - | - | - | 299 | 2,291 | - | - | 2,291 | - | - | - | - | - | - | - | 11,902 | - |
| 3b.1.1.3 | Condensate Storage Tank Foundation | - | 7 | - | - | - | - | - | 1 | 8 | - | - | 8 | - | - | - | - | - | - | - | 33 | - |
| 3b.1.1.4 | Construction Warehouse & Fab Shop | - | 130 | - | - | - | - | - | 19 | 149 | - | - | 149 | - | - | - | - | - | - | - | 1,405 | - |
| 3b.1.1.5 | D3/D4 Emergency Generator | - | 14 | - | - | - | - | - | 2 | 16 | - | - | 16 | - | - | - | - | - | - | - | 84 | - |
| 3b.1.1.6 | Drum Transfer & Truck Loading Enclosure | - | 20 | - | - | - | - | - | 3 | 24 | - | - | 24 | - | - | - | - | - | - | - | 221 | - |
| 3b.1.1.7 | Hydrogen House | - | 6 | - | - | - | - | - | 1 | 7 | - | - | 7 | - | - | - | - | - | - | - | 47 | - |
| 3b.1.1.8 | LLRW Storage Enclosure | - | 128 | - | - | - | - | - | 19 | 147 | - | - | 147 | - | - | - | - | - | - | - | 853 | - |
| 3b.1.1.9 | Misc Structures 2017 | - | 2,617 | - | - | - | - | - | 393 | 3,009 | - | - | 3,009 | - | - | - | - | - | - | - | 22,582 | - |
| 3b.1.1.10 | Radwaste | - | 176 | - | - | - | - | - | 26 | 202 | - | - | 202 | - | - | - | - | - | - | - | 1,400 | - |
| 3b.1.1.11 | Resin Disposal | - | 14 | - | - | - | - | - | 2 | 16 | - | - | 16 | - | - | - | - | - | - | - | 120 | - |
| 3b.1.1.12 | Structures below 3' below grade | - | 1,785 | - | - | - | - | - | 268 | 2,052 | - | - | 2,052 | - | - | - | - | - | - | - | 9,238 | - |
| 3b.1.1.13 | Sulfuric Acid Tank Enclosure | - | 3 | - | - | - | - | - | 0 | 4 | - | - | 4 | - | - | - | - | - | - | - | 35 | - |
| 3b.1.1.14 | Turbine | - | 2,140 | - | - | - | - | - | 321 | 2,461 | - | - | 2,461 | - | - | - | - | - | - | - | 21,997 | - |
| 3b.1.1.15 | Turbine Pedestal | - | 365 | - | - | - | - | - | 55 | 420 | - | - | 420 | - | - | - | - | - | - | - | 1,857 | - |
| 3b.1.1.16 | Warehouse #2 | - | 24 | - | - | - | - | - | 4 | 27 | - | - | 27 | - | - | - | - | - | - | - | 213 | - |
| 3b.1.1.17 | Waste Neutralizing Tank House | - | 7 | - | - | - | - | - | 1 | 8 | - | - | 8 | - | - | - | - | - | - | - | 56 | - |
| 3b.1.1.18 | Waste Oil Storage | - | 9 | - | - | - | - | - | 1 | 10 | - | - | 10 | - | - | - | - | - | - | - | 70 | - |
| 3b.1.1.19 | Water Treatment | - | 324 | - | - | - | - | - | 49 | 373 | - | - | 373 | - | - | - | - | - | - | - | 2,690 | - |
| 3b.1.1.20 | Fuel Handling of Aux Building | - | 1,095 | - | - | - | - | - | 164 | 1,259 | - | - | 1,259 | - | - | - | - | - | - | - | 8,240 | - |
| 3b.1.1 | Totals | - | 15,501 | - | - | - | - | - | 2,325 | 17,826 | - | - | 17,826 | - | - | - | - | - | - | - | 127,723 | - |
| Site Closeout Activities | | | | | | | | | | | | | | | | | | | | | | |
| 3b.1.2 | Remove Rubble | - | 1,330 | - | - | - | - | - | 200 | 1,530 | - | - | 1,530 | - | - | - | - | - | - | - | 6,495 | - |
| 3b.1.3 | Grade & landscape site | - | 448 | - | - | - | - | - | 67 | 515 | - | - | 515 | - | - | - | - | - | - | - | 921 | - |
| 3b.1.4 | Final report to NRC | - | - | - | - | - | - | 86 | 13 | 99 | 99 | - | - | - | - | - | - | - | - | - | - | 667 |
| 3b.1 | Subtotal Period 3b Activity Costs | - | 17,279 | - | - | - | - | 86 | 2,605 | 19,969 | 99 | - | 19,871 | - | - | - | - | - | - | - | 135,138 | 667 |
| Period 3b Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3b.2.1 | Clean Concrete Disposal | - | 4,912 | - | - | - | - | 10 | 738 | 5,660 | - | - | 5,660 | - | - | - | - | - | - | - | 18,372 | - |
| 3b.2.2 | Intake Structure Cofferdam | - | 442 | - | - | - | - | - | 66 | 508 | - | - | 508 | - | - | - | - | - | - | - | 3,552 | - |
| 3b.2.3 | Construction Debris | - | - | - | - | - | - | 2,150 | 323 | 2,473 | - | - | 2,473 | - | - | - | - | - | - | - | - | - |
| 3b.2.4 | Backfill | - | 9,257 | - | - | - | - | - | 1,388 | 10,645 | - | - | 10,645 | - | - | - | - | - | - | - | 9,327 | - |
| 3b.2.5 | Disposition of Original Casks | - | 24 | 80 | 418 | - | 2,390 | - | 728 | 3,640 | 3,640 | - | - | - | 8,929 | - | - | - | - | 1,059,612 | 146 | - |
| 3b.2 | Subtotal Period 3b Additional Costs | - | 14,634 | 80 | 418 | - | 2,390 | 2,160 | 3,244 | 22,926 | 3,640 | - | 19,286 | - | 8,929 | - | - | - | - | 1,059,612 | 31,397 | - |
| Period 3b Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3b.3.1 | Small tool allowance | - | 212 | - | - | - | - | - | 32 | 244 | - | - | 244 | - | - | - | - | - | - | - | - | - |
| 3b.3.2 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 2,649 | - | 2,649 | - | 2,649 | - | - | - | - | - | - | - | - | - | - |
| 3b.3 | Subtotal Period 3b Collateral Costs | - | 212 | - | - | - | - | 2,649 | 32 | 2,893 | - | 2,649 | 244 | - | - | - | - | - | - | - | - | - |
| Period 3b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3b.4.1 | Insurance | - | - | - | - | - | - | 513 | 51 | 565 | 565 | - | - | - | - | - | - | - | - | - | - | - |
| 3b.4.2 | Property taxes | - | - | - | - | - | - | 4,167 | 417 | 4,583 | - | 4,583 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.3 | Heavy equipment rental | - | 7,144 | - | - | - | - | - | 1,072 | 8,215 | - | - | 8,215 | - | - | - | - | - | - | - | - | - |
| 3b.4.4 | Plant energy budget | - | - | - | - | - | - | 344 | 52 | 395 | - | 395 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.5 | NRC ISFSI Fees | - | - | - | - | - | - | 218 | 22 | 239 | - | 239 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.6 | Emergency Planning Fees | - | - | - | - | - | - | 157 | 16 | 173 | - | 173 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.7 | Fixed Overhead | - | - | - | - | - | - | 1,024 | 154 | 1,178 | 397 | 781 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.8 | ISFSI Operating Costs | - | - | - | - | - | - | 119 | 18 | 136 | - | 136 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.9 | Railroad Track Maintenance | - | - | - | - | - | - | 361 | 54 | 416 | 153 | 263 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.10 | Security Staff Cost | - | - | - | - | - | - | 4,616 | 692 | 5,308 | - | 5,308 | - | - | - | - | - | - | - | - | - | 57,340 |
| 3b.4.11 | DOC Staff Cost | - | - | - | - | - | - | 10,921 | 1,638 | 12,559 | - | - | 12,559 | - | - | - | - | - | - | - | - | 116,885 |
| 3b.4.12 | Utility Staff Cost | - | - | - | - | - | - | 5,170 | 776 | 5,946 | - | 1,278 | 4,668 | - | - | - | - | - | - | - | - | 76,637 |
| 3b.4 | Subtotal Period 3b Period-Dependent Costs | - | 7,144 | - | - | - | - | 27,610 | 4,960 | 39,714 | 1,114 | 13,158 | 25,442 | - | - | - | - | - | - | - | - | 250,861 |
| 3b.0 | TOTAL PERIOD 3b COST | - | 39,269 | 80 | 418 | - | 2,390 | 32,505 | 10,840 | 85,502 | 4,853 | 15,807 | 64,843 | - | 8,929 | - | - | - | - | 1,059,612 | 166,534 | 251,528 |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table F-2
Prairie Island DECON Unit 2
DECON Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | GTCC Cu. Feet | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | | | | |
| PERIOD 3c - Fuel Storage Operations/Shipping | | | | | | | | | | | | | | | | | | | | | |
| Period 3c Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| Period 3c Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 3c.3.1 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 625,425 | 93,814 | 719,239 | - | 719,239 | - | - | - | - | - | - | - | - | - |
| 3c.3.2 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 219,357 | - | 219,357 | - | 219,357 | - | - | - | - | - | - | - | - | - |
| 3c.3 | Subtotal Period 3c Collateral Costs | - | - | - | - | - | - | 844,782 | 93,814 | 938,596 | - | 938,596 | - | - | - | - | - | - | - | - | - |
| Period 3c Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 3c.4.1 | Insurance | - | - | - | - | - | - | 42,518 | 4,252 | 46,770 | - | 46,770 | - | - | - | - | - | - | - | - | - |
| 3c.4.2 | Property taxes | - | - | - | - | - | - | 242,919 | 24,292 | 267,210 | - | 267,210 | - | - | - | - | - | - | - | - | - |
| 3c.4.4 | NRC ISFSI Fees | - | - | - | - | - | - | 19,571 | 1,957 | 21,528 | - | 21,528 | - | - | - | - | - | - | - | - | - |
| 3c.4.5 | Emergency Planning Fees | - | - | - | - | - | - | 13,018 | 1,302 | 14,320 | - | 14,320 | - | - | - | - | - | - | - | - | - |
| 3c.4.6 | Fixed Overhead | - | - | - | - | - | - | 28,613 | 4,292 | 32,905 | - | 32,905 | - | - | - | - | - | - | - | - | - |
| 3c.4.7 | ISFSI Operating Costs | - | - | - | - | - | - | 9,828 | 1,474 | 11,302 | - | 11,302 | - | - | - | - | - | - | - | - | - |
| 3c.4.8 | Railroad Track Maintenance | - | - | - | - | - | - | 10,979 | 1,647 | 12,626 | - | 12,626 | - | - | - | - | - | - | - | - | - |
| 3c.4.9 | Security Staff Cost | - | - | - | - | - | - | 382,242 | 57,336 | 439,578 | - | 439,578 | - | - | - | - | - | - | - | - | 4,748,373 |
| 3c.4.10 | DOC Staff Cost | - | - | - | - | - | - | 26,917 | 4,038 | 30,955 | - | 30,955 | - | - | - | - | - | - | - | - | 182,630 |
| 3c.4.11 | Utility Staff Cost | - | - | - | - | - | - | 165,731 | 24,860 | 190,591 | - | 190,591 | - | - | - | - | - | - | - | - | 2,419,844 |
| 3c.4 | Subtotal Period 3c Period-Dependent Costs | - | - | - | - | - | - | 942,335 | 125,449 | 1,067,784 | - | 1,067,784 | - | - | - | - | - | - | - | - | 7,350,846 |
| 3c.0 | TOTAL PERIOD 3c COST | - | - | - | - | - | - | 1,787,117 | 219,263 | 2,006,380 | - | 2,006,380 | - | - | - | - | - | - | - | - | 7,350,846 |
| PERIOD 3d - GTCC shipping | | | | | | | | | | | | | | | | | | | | | |
| Period 3d Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| Nuclear Steam Supply System Removal | | | | | | | | | | | | | | | | | | | | | |
| 3d.1.1.1 | Vessel & Internals GTCC Disposal | - | - | 1,444 | - | - | 8,680 | - | 1,663 | 11,787 | 11,787 | - | - | - | - | - | - | 1,773 | 344,823 | - | - |
| 3d.1.1 | Totals | - | - | 1,444 | - | - | 8,680 | - | 1,663 | 11,787 | 11,787 | - | - | - | - | - | - | 1,773 | 344,823 | - | - |
| 3d.1 | Subtotal Period 3d Activity Costs | - | - | 1,444 | - | - | 8,680 | - | 1,663 | 11,787 | 11,787 | - | - | - | - | - | - | 1,773 | 344,823 | - | - |
| Period 3d Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 3d.3.1 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 28 | 4 | 32 | - | 32 | - | - | - | - | - | - | - | - | - |
| 3d.3.2 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 48 | - | 48 | - | 48 | - | - | - | - | - | - | - | - | - |
| 3d.3 | Subtotal Period 3d Collateral Costs | - | - | - | - | - | - | 76 | 4 | 80 | - | 80 | - | - | - | - | - | - | - | - | - |
| Period 3d Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 3d.4.1 | Insurance | - | - | - | - | - | - | 9 | 1 | 10 | 10 | - | - | - | - | - | - | - | - | - | - |
| 3d.4.2 | Property taxes | - | - | - | - | - | - | 53 | 5 | 58 | 58 | - | - | - | - | - | - | - | - | - | - |
| 3d.4.4 | NRC ISFSI Fees | - | - | - | - | - | - | 4 | 0 | 4 | - | 4 | - | - | - | - | - | - | - | - | - |
| 3d.4.5 | Emergency Planning Fees | - | - | - | - | - | - | 3 | 0 | 3 | - | 3 | - | - | - | - | - | - | - | - | - |
| 3d.4.6 | Fixed Overhead | - | - | - | - | - | - | 6 | 1 | 7 | 7 | - | - | - | - | - | - | - | - | - | - |
| 3d.4.7 | Railroad Track Maintenance | - | - | - | - | - | - | 2 | 0 | 3 | 3 | - | - | - | - | - | - | - | - | - | - |
| 3d.4.8 | Security Staff Cost | - | - | - | - | - | - | 83 | 13 | 96 | 96 | - | - | - | - | - | - | - | - | - | 1,037 |
| 3d.4.9 | Utility Staff Cost | - | - | - | - | - | - | 19 | 3 | 22 | 22 | - | - | - | - | - | - | - | - | - | 269 |
| 3d.4 | Subtotal Period 3d Period-Dependent Costs | - | - | - | - | - | - | 181 | 24 | 204 | 197 | 7 | - | - | - | - | - | - | - | - | 1,306 |
| 3d.0 | TOTAL PERIOD 3d COST | - | - | 1,444 | - | - | 8,680 | 256 | 1,691 | 12,071 | 11,984 | 87 | - | - | - | - | - | 1,773 | 344,823 | - | 1,306 |
| PERIOD 3e - ISFSI Decontamination | | | | | | | | | | | | | | | | | | | | | |
| Period 3e Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| Period 3e Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 3e.2.1 | License Termination ISFSI | - | 0 | 2 | 17 | - | 142 | 1,197 | 339 | 1,696 | 1,696 | - | - | - | 424 | - | - | - | 65,754 | 5,882 | 1,161 |
| 3e.2 | Subtotal Period 3e Additional Costs | - | 0 | 2 | 17 | - | 142 | 1,197 | 339 | 1,696 | 1,696 | - | - | - | 424 | - | - | - | 65,754 | 5,882 | 1,161 |
| Period 3e Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 3e.4.1 | Insurance | - | - | - | - | - | - | 93 | 23 | 116 | 116 | - | - | - | - | - | - | - | - | - | - |
| 3e.4.2 | Property taxes | - | - | - | - | - | - | 56 | 14 | 69 | 69 | - | - | - | - | - | - | - | - | - | - |
| 3e.4.3 | Plant energy budget | - | - | - | - | - | - | 11 | 3 | 13 | 13 | - | - | - | - | - | - | - | - | - | - |
| 3e.4.4 | Fixed Overhead | - | - | - | - | - | - | 54 | 14 | 68 | 68 | - | - | - | - | - | - | - | - | - | - |
| 3e.4.5 | Railroad Track Maintenance | - | - | - | - | - | - | 21 | 5 | 26 | 26 | - | - | - | - | - | - | - | - | - | - |
| 3e.4.6 | Security Staff Cost | - | - | - | - | - | - | 174 | 43 | 217 | 217 | - | - | - | - | - | - | - | - | - | 2,500 |
| 3e.4.7 | Utility Staff Cost | - | - | - | - | - | - | 129 | 32 | 161 | 161 | - | - | - | - | - | - | - | - | - | 1,896 |
| 3e.4 | Subtotal Period 3e Period-Dependent Costs | - | - | - | - | - | - | 536 | 134 | 670 | 670 | - | - | - | - | - | - | - | - | - | 4,396 |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table F-2
Prairie Island DECON Unit 2
DECON Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| 3e.0 | TOTAL PERIOD 3e COST | - | 0 | 2 | 17 | - | 142 | 1,733 | 473 | 2,367 | 2,367 | - | - | - | 424 | - | - | - | 65,754 | 5,882 | 5,556 |
| PERIOD 3f - ISFSI Site Restoration | | | | | | | | | | | | | | | | | | | | | |
| Period 3f Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| Period 3f Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 3f.2.1 | Demolition and Site Restoration of ISFSI | - | 1,121 | - | - | - | - | 161 | 192 | 1,474 | - | - | 1,474 | - | - | - | - | - | - | 4,846 | 80 |
| 3f.2 | Subtotal Period 3f Additional Costs | - | 1,121 | - | - | - | - | 161 | 192 | 1,474 | - | - | 1,474 | - | - | - | - | - | - | 4,846 | 80 |
| Period 3f Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 3f.3.1 | Small tool allowance | - | 7 | - | - | - | - | - | 1 | 8 | - | - | 8 | - | - | - | - | - | - | - | - |
| 3f.3 | Subtotal Period 3f Collateral Costs | - | 7 | - | - | - | - | - | 1 | 8 | - | - | 8 | - | - | - | - | - | - | - | - |
| Period 3f Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 3f.4.2 | Property taxes | - | - | - | - | - | - | 28 | 3 | 31 | - | - | 31 | - | - | - | - | - | - | - | - |
| 3f.4.3 | Heavy equipment rental | - | 59 | - | - | - | - | - | 9 | 68 | - | - | 68 | - | - | - | - | - | - | - | - |
| 3f.4.4 | Plant energy budget | - | - | - | - | - | - | 6 | 1 | 6 | - | - | 6 | - | - | - | - | - | - | - | - |
| 3f.4.5 | Fixed Overhead | - | - | - | - | - | - | 28 | 4 | 32 | - | - | 32 | - | - | - | - | - | - | - | - |
| 3f.4.6 | Railroad Track Maintenance | - | - | - | - | - | - | 11 | 2 | 12 | - | - | 12 | - | - | - | - | - | - | - | - |
| 3f.4.7 | Security Staff Cost | - | - | - | - | - | - | 89 | 13 | 102 | - | - | 102 | - | - | - | - | - | - | - | 1,281 |
| 3f.4.8 | Utility Staff Cost | - | - | - | - | - | - | 55 | 8 | 63 | - | - | 63 | - | - | - | - | - | - | - | 795 |
| 3f.4 | Subtotal Period 3f Period-Dependent Costs | - | 59 | - | - | - | - | 216 | 40 | 315 | - | - | 315 | - | - | - | - | - | - | - | 2,076 |
| 3f.0 | TOTAL PERIOD 3f COST | - | 1,187 | - | - | - | - | 377 | 233 | 1,798 | - | - | 1,798 | - | - | - | - | - | - | 4,846 | 2,156 |
| PERIOD 3 TOTALS | | - | 40,456 | 1,525 | 435 | - | 11,212 | 1,821,988 | 232,501 | 2,108,117 | 19,203 | 2,022,273 | 66,641 | - | 9,353 | - | - | 1,773 | 1,470,189 | 177,262 | 7,611,392 |
| TOTAL COST TO DECOMMISSION | | 13,876 | 116,855 | 23,184 | 8,596 | 26,793 | 61,273 | 2,194,551 | 341,405 | 2,786,532 | 591,409 | 2,121,394 | 73,730 | 169,384 | 184,108 | 826 | 673 | 1,773 | 17,058,250 | 981,176 | 10,289,830 |

| | | |
|--|--------------------|----------------------------------|
| TOTAL COST TO DECOMMISSION WITH 13.96% CONTINGENCY: | \$2,786,532 | thousands of 2020 dollars |
| TOTAL NRC LICENSE TERMINATION COST IS 21.22% OR: | \$591,409 | thousands of 2020 dollars |
| SPENT FUEL MANAGEMENT COST IS 76.13% OR: | \$2,121,394 | thousands of 2020 dollars |
| NON-NUCLEAR DEMOLITION COST IS 2.65% OR: | \$73,730 | thousands of 2020 dollars |
| TOTAL LOW-LEVEL RADIOACTIVE WASTE VOLUME BURIED (EXCLUDING GTCC): | 185,606 | Cubic Feet |
| TOTAL GREATER THAN CLASS C RADWASTE VOLUME GENERATED: | 1,773 | Cubic Feet |
| TOTAL SCRAP METAL REMOVED: | 42,328 | Tons |
| TOTAL CRAFT LABOR REQUIREMENTS: | 981,176 | Man-hours |

End Notes:
n/a - indicates that this activity not charged as decommissioning expense
a - indicates that this activity performed by decommissioning staff
0 - indicates that this value is less than 0.5 but is non-zero
A cell containing " - " indicates a zero value

***Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis***

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APPENDIX G

DETAILED COST ANALYSIS

SCENARIO 5: SAFSTOR with 42 Year DFS

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| Prairie Island Nuclear Generating Plant, Unit 1 | G-2 |
| Prairie Island Nuclear Generating Plant, Unit 2 | G-12 |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table G-1
Prairie Island SAFSTOR Unit 1
SAFSTOR Decommissioning Cost Estimate with DOE Pickup of Industry Spent Fuel Starting in 2035
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|--|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|---------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| PERIOD 1a - Shutdown through Transition | | | | | | | | | | | | | | | | | | | | | | |
| Period 1a Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| 1a.1.1 | SAFSTOR site characterization survey | - | - | - | - | - | - | 415 | 124 | 539 | 539 | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.2 | Prepare preliminary decommissioning cost | - | - | - | - | - | - | 167 | 25 | 192 | 192 | - | - | - | - | - | - | - | - | - | - | 1,300 |
| 1a.1.3 | Notification of Cessation of Operations | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.4 | Remove fuel & source material | - | - | - | - | - | - | - | - | n/a | - | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.5 | Notification of Permanent Defueling | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.6 | Deactivate plant systems & process waste | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.7 | Prepare and submit PSDAR | - | - | - | - | - | - | 257 | 39 | 296 | 296 | - | - | - | - | - | - | - | - | - | - | 2,000 |
| 1a.1.8 | Review plant dwgs & specs. | - | - | - | - | - | - | 167 | 25 | 192 | 192 | - | - | - | - | - | - | - | - | - | - | 1,300 |
| 1a.1.9 | Perform detailed rad survey | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.10 | Estimate by-product inventory | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | - | 1,000 |
| 1a.1.11 | End product description | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | - | 1,000 |
| 1a.1.12 | Detailed by-product inventory | - | - | - | - | - | - | 193 | 29 | 222 | 222 | - | - | - | - | - | - | - | - | - | - | 1,500 |
| 1a.1.13 | Define major work sequence | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | - | 1,000 |
| 1a.1.14 | Perform SER and EA | - | - | - | - | - | - | 398 | 60 | 458 | 458 | - | - | - | - | - | - | - | - | - | - | 3,100 |
| 1a.1.15 | Perform Site-Specific Cost Study | - | - | - | - | - | - | 643 | 96 | 739 | 739 | - | - | - | - | - | - | - | - | - | - | 5,000 |
| Activity Specifications | | | | | | | | | | | | | | | | | | | | | | |
| 1a.1.16.1 | Prepare plant and facilities for SAFSTOR | - | - | - | - | - | - | 632 | 95 | 727 | 727 | - | - | - | - | - | - | - | - | - | - | 4,920 |
| 1a.1.16.2 | Plant systems | - | - | - | - | - | - | 536 | 80 | 616 | 616 | - | - | - | - | - | - | - | - | - | - | 4,167 |
| 1a.1.16.3 | Plant structures and buildings | - | - | - | - | - | - | 401 | 60 | 461 | 461 | - | - | - | - | - | - | - | - | - | - | 3,120 |
| 1a.1.16.4 | Waste management | - | - | - | - | - | - | 257 | 39 | 296 | 296 | - | - | - | - | - | - | - | - | - | - | 2,000 |
| 1a.1.16.5 | Facility and site dormancy | - | - | - | - | - | - | 257 | 39 | 296 | 296 | - | - | - | - | - | - | - | - | - | - | 2,000 |
| 1a.1.16 | Total | - | - | - | - | - | - | 2,083 | 312 | 2,395 | 2,395 | - | - | - | - | - | - | - | - | - | - | 16,207 |
| Detailed Work Procedures | | | | | | | | | | | | | | | | | | | | | | |
| 1a.1.17.1 | Plant systems | - | - | - | - | - | - | 152 | 23 | 175 | 175 | - | - | - | - | - | - | - | - | - | - | 1,183 |
| 1a.1.17.2 | Facility closeout & dormancy | - | - | - | - | - | - | 154 | 23 | 177 | 177 | - | - | - | - | - | - | - | - | - | - | 1,200 |
| 1a.1.17 | Total | - | - | - | - | - | - | 306 | 46 | 352 | 352 | - | - | - | - | - | - | - | - | - | - | 2,383 |
| 1a.1.18 | Procure vacuum drying system | - | - | - | - | - | - | 13 | 2 | 15 | 15 | - | - | - | - | - | - | - | - | - | - | 100 |
| 1a.1.19 | Drain/de-energize non-cont. systems | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.20 | Drain & dry NSSS | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.21 | Drain/de-energize contaminated systems | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.22 | Decon/secure contaminated systems | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1 | Subtotal Period 1a Activity Costs | - | - | - | - | - | - | 5,027 | 816 | 5,844 | 5,844 | - | - | - | - | - | - | - | - | - | - | 35,890 |
| Period 1a Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 1a.3.1 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 1,249 | - | 1,249 | - | 1,249 | - | - | - | - | - | - | - | - | - | - |
| 1a.3 | Subtotal Period 1a Collateral Costs | - | - | - | - | - | - | 1,249 | - | 1,249 | - | 1,249 | - | - | - | - | - | - | - | - | - | - |
| Period 1a Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 1a.4.1 | Insurance | - | - | - | - | - | - | 1,660 | 166 | 1,826 | 1,826 | - | - | - | - | - | - | - | - | - | - | - |
| 1a.4.2 | Property taxes | - | - | - | - | - | - | 3,623 | 362 | 3,985 | 3,985 | - | - | - | - | - | - | - | - | - | - | - |
| 1a.4.3 | Health physics supplies | - | 614 | - | - | - | - | - | 153 | 767 | 767 | - | - | - | - | - | - | - | - | - | - | - |
| 1a.4.4 | Heavy equipment rental | - | 753 | - | - | - | - | - | 113 | 866 | 866 | - | - | - | - | - | - | - | - | - | - | - |
| 1a.4.5 | Disposal of DAW generated | - | - | 12 | 5 | - | 50 | - | 14 | 82 | 82 | - | - | - | 610 | - | - | - | - | 12,190 | 20 | - |
| 1a.4.6 | Plant energy budget | - | - | - | - | - | - | 1,621 | 243 | 1,864 | 1,864 | - | - | - | - | - | - | - | - | - | - | - |
| 1a.4.7 | NRC Fees | - | - | - | - | - | - | 892 | 89 | 981 | 981 | - | - | - | - | - | - | - | - | - | - | - |
| 1a.4.8 | Emergency Planning Fees | - | - | - | - | - | - | 2,174 | 217 | 2,392 | - | 2,392 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.9 | Fixed Overhead | - | - | - | - | - | - | 1,440 | 216 | 1,656 | 1,656 | - | - | - | - | - | - | - | - | - | - | - |
| 1a.4.10 | Spent Fuel Pool O&M | - | - | - | - | - | - | 422 | 63 | 486 | - | 486 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.11 | ISFSI Operating Costs | - | - | - | - | - | - | 56 | 8 | 64 | - | 64 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.12 | Railroad Track Maintenance | - | - | - | - | - | - | 63 | 9 | 72 | 72 | - | - | - | - | - | - | - | - | - | - | - |
| 1a.4.13 | Security Staff Cost | - | - | - | - | - | - | 8,328 | 1,249 | 9,577 | 9,577 | - | - | - | - | - | - | - | - | - | - | 122,720 |
| 1a.4.14 | Utility Staff Cost | - | - | - | - | - | - | 26,931 | 4,040 | 30,971 | 30,971 | - | - | - | - | - | - | - | - | - | - | 422,240 |
| 1a.4 | Subtotal Period 1a Period-Dependent Costs | - | 1,367 | 12 | 5 | - | 50 | 47,211 | 6,945 | 55,590 | 52,648 | 2,942 | - | - | 610 | - | - | - | - | 12,190 | 20 | 544,960 |
| 1a.0 | TOTAL PERIOD 1a COST | - | 1,367 | 12 | 5 | - | 50 | 53,487 | 7,761 | 62,683 | 58,492 | 4,191 | - | - | 610 | - | - | - | - | 12,190 | 20 | 580,850 |

**Prairie Island Nuclear Generating Plant
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**Table G-1
Prairie Island SAFSTOR Unit 1
SAFSTOR Decommissioning Cost Estimate with DOE Pickup of Industry Spent Fuel Starting in 2035
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|--|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| PERIOD 1b - SAFSTOR Limited DECON Activities | | | | | | | | | | | | | | | | | | | | | |
| Period 1b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| Decontamination of Site Buildings | | | | | | | | | | | | | | | | | | | | | |
| 1b.1.1.1 | Reactor | 1,199 | - | - | - | - | - | - | 599 | 1,798 | 1,798 | - | - | - | - | - | - | - | - | 17,003 | - |
| 1b.1.1 | Totals | 1,199 | - | - | - | - | - | - | 599 | 1,798 | 1,798 | - | - | - | - | - | - | - | - | 17,003 | - |
| 1b.1 | Subtotal Period 1b Activity Costs | 1,199 | - | - | - | - | - | - | 599 | 1,798 | 1,798 | - | - | - | - | - | - | - | - | 17,003 | - |
| Period 1b Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 1b.2.1 | Spent Fuel Pool Isolation | - | - | - | - | - | - | 12,675 | 1,901 | 14,576 | 14,576 | - | - | - | - | - | - | - | - | - | - |
| 1b.2 | Subtotal Period 1b Additional Costs | - | - | - | - | - | - | 12,675 | 1,901 | 14,576 | 14,576 | - | - | - | - | - | - | - | - | - | - |
| Period 1b Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 1b.3.1 | Decon equipment | 1,055 | - | - | - | - | - | - | 158 | 1,213 | 1,213 | - | - | - | - | - | - | - | - | - | - |
| 1b.3.2 | Process decommissioning water waste | 79 | - | 52 | 94 | - | 212 | - | 112 | 549 | 549 | - | - | - | 487 | - | - | - | - | 29,193 | 95 |
| 1b.3.4 | Small tool allowance | - | 20 | - | - | - | - | - | 3 | 23 | 23 | - | - | - | - | - | - | - | - | - | - |
| 1b.3.5 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 311 | - | 311 | - | 311 | - | - | - | - | - | - | - | - | - |
| 1b.3 | Subtotal Period 1b Collateral Costs | 1,134 | 20 | 52 | 94 | - | 212 | 311 | 273 | 2,097 | 1,785 | 311 | - | - | 487 | - | - | - | - | 29,193 | 95 |
| Period 1b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 1b.4.1 | Decon supplies | 449 | - | - | - | - | - | - | 112 | 561 | 561 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.2 | Insurance | - | - | - | - | - | - | 414 | 41 | 455 | 455 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.3 | Property taxes | - | - | - | - | - | - | 903 | 90 | 994 | 994 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.4 | Health physics supplies | - | 250 | - | - | - | - | - | 63 | 313 | 313 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.5 | Heavy equipment rental | - | 188 | - | - | - | - | - | 28 | 216 | 216 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.6 | Disposal of DAW generated | - | - | 6 | 3 | - | 27 | - | 8 | 43 | 43 | - | - | - | 324 | - | - | - | - | 6,486 | 11 |
| 1b.4.7 | Plant energy budget | - | - | - | - | - | - | 404 | 61 | 465 | 465 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.8 | NRC Fees | - | - | - | - | - | - | 161 | 16 | 177 | 177 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.9 | Emergency Planning Fees | - | - | - | - | - | - | 542 | 54 | 596 | - | 596 | - | - | - | - | - | - | - | - | - |
| 1b.4.10 | Fixed Overhead | - | - | - | - | - | - | 359 | 54 | 413 | 413 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.11 | Spent Fuel Pool O&M | - | - | - | - | - | - | 105 | 16 | 121 | - | 121 | - | - | - | - | - | - | - | - | - |
| 1b.4.12 | ISFSI Operating Costs | - | - | - | - | - | - | 14 | 2 | 16 | - | 16 | - | - | - | - | - | - | - | - | - |
| 1b.4.13 | Railroad Track Maintenance | - | - | - | - | - | - | 16 | 2 | 18 | 18 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.14 | Security Staff Cost | - | - | - | - | - | - | 2,076 | 311 | 2,388 | 2,388 | - | - | - | - | - | - | - | - | - | 30,596 |
| 1b.4.15 | Utility Staff Cost | - | - | - | - | - | - | 6,714 | 1,007 | 7,722 | 7,722 | - | - | - | - | - | - | - | - | - | 105,271 |
| 1b.4 | Subtotal Period 1b Period-Dependent Costs | 449 | 438 | 6 | 3 | - | 27 | 11,709 | 1,866 | 14,498 | 13,764 | 733 | - | - | 324 | - | - | - | - | 6,486 | 11 |
| 1b.0 | TOTAL PERIOD 1b COST | 2,781 | 458 | 59 | 97 | - | 239 | 24,696 | 4,640 | 32,969 | 31,924 | 1,045 | - | - | 811 | - | - | - | - | 35,678 | 17,108 |
| PERIOD 1c - Preparations for SAFSTOR Dormancy | | | | | | | | | | | | | | | | | | | | | |
| Period 1c Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| 1c.1.1 | Prepare support equipment for storage | - | 527 | - | - | - | - | - | 79 | 606 | 606 | - | - | - | - | - | - | - | - | - | 3,000 |
| 1c.1.2 | Install containment pressure equal. lines | - | 54 | - | - | - | - | - | 8 | 62 | 62 | - | - | - | - | - | - | - | - | - | 700 |
| 1c.1.3 | Interim survey prior to dormancy | - | - | - | - | - | - | 733 | 220 | 953 | 953 | - | - | - | - | - | - | - | - | - | 12,801 |
| 1c.1.4 | Secure building accesses | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1c.1.5 | Prepare & submit interim report | - | - | - | - | - | - | 75 | 11 | 86 | 86 | - | - | - | - | - | - | - | - | - | 583 |
| 1c.1 | Subtotal Period 1c Activity Costs | - | 581 | - | - | - | - | 808 | 318 | 1,707 | 1,707 | - | - | - | - | - | - | - | - | - | 16,501 |
| Period 1c Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 1c.3.1 | Process decommissioning water waste | 91 | - | 60 | 109 | - | 245 | - | 129 | 634 | 634 | - | - | - | 561 | - | - | - | - | 33,685 | 109 |
| 1c.3.3 | Small tool allowance | - | 5 | - | - | - | - | - | 1 | 6 | 6 | - | - | - | - | - | - | - | - | - | - |
| 1c.3.4 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 163 | 25 | 188 | - | 188 | - | - | - | - | - | - | - | - | - |
| 1c.3.5 | Retention and Severance | - | - | - | - | - | - | 1,032 | 155 | 1,187 | 1,187 | - | - | - | - | - | - | - | - | - | - |
| 1c.3.6 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 311 | - | 311 | - | 311 | - | - | - | - | - | - | - | - | - |
| 1c.3 | Subtotal Period 1c Collateral Costs | 91 | 5 | 60 | 109 | - | 245 | 1,507 | 309 | 2,325 | 1,826 | 499 | - | - | 561 | - | - | - | - | 33,685 | 109 |
| Period 1c Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 1c.4.1 | Insurance | - | - | - | - | - | - | 414 | 41 | 455 | 455 | - | - | - | - | - | - | - | - | - | - |
| 1c.4.2 | Property taxes | - | - | - | - | - | - | 903 | 90 | 994 | 994 | - | - | - | - | - | - | - | - | - | - |
| 1c.4.3 | Health physics supplies | - | 248 | - | - | - | - | - | 62 | 309 | 309 | - | - | - | - | - | - | - | - | - | - |
| 1c.4.4 | Heavy equipment rental | - | 188 | - | - | - | - | - | 28 | 216 | 216 | - | - | - | - | - | - | - | - | - | - |
| 1c.4.5 | Disposal of DAW generated | - | - | 3 | 1 | - | 13 | - | 4 | 20 | 20 | - | - | - | 152 | - | - | - | - | 3,039 | 5 |
| 1c.4.6 | Plant energy budget | - | - | - | - | - | - | 404 | 61 | 465 | 465 | - | - | - | - | - | - | - | - | - | - |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table G-1
Prairie Island SAFSTOR Unit 1
SAFSTOR Decommissioning Cost Estimate with DOE Pickup of Industry Spent Fuel Starting in 2035
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|---|--------------|--------------|-----------------|-----------------|---------------------------|---------------------|---------------|-------------------|----------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| Period 1c Period-Dependent Costs (continued) | | | | | | | | | | | | | | | | | | | | | |
| 1c.4.7 | NRC Fees | - | - | - | - | - | - | 161 | 16 | 177 | 177 | - | - | - | - | - | - | - | - | - | - |
| 1c.4.8 | Emergency Planning Fees | - | - | - | - | - | - | 542 | 54 | 596 | - | 596 | - | - | - | - | - | - | - | - | - |
| 1c.4.9 | Fixed Overhead | - | - | - | - | - | - | 359 | 54 | 413 | 413 | - | - | - | - | - | - | - | - | - | - |
| 1c.4.10 | Spent Fuel Pool O&M | - | - | - | - | - | - | 105 | 16 | 121 | - | 121 | - | - | - | - | - | - | - | - | - |
| 1c.4.11 | ISFSI Operating Costs | - | - | - | - | - | - | 14 | 2 | 16 | - | 16 | - | - | - | - | - | - | - | - | - |
| 1c.4.12 | Railroad Track Maintenance | - | - | - | - | - | - | 16 | 2 | 18 | 18 | - | - | - | - | - | - | - | - | - | - |
| 1c.4.13 | Security Staff Cost | - | - | - | - | - | - | 2,076 | 311 | 2,388 | 2,388 | - | - | - | - | - | - | - | - | - | 30,596 |
| 1c.4.14 | Utility Staff Cost | - | - | - | - | - | - | 6,714 | 1,007 | 7,722 | 7,722 | - | - | - | - | - | - | - | - | - | 105,271 |
| 1c.4 | Subtotal Period 1c Period-Dependent Costs | - | 435 | 3 | 1 | - | 13 | 11,709 | 1,749 | 13,910 | 13,177 | 733 | - | - | 152 | - | - | - | 3,039 | 5 | 135,867 |
| 1c.0 | TOTAL PERIOD 1c COST | 91 | 1,021 | 63 | 110 | - | 257 | 14,024 | 2,376 | 17,943 | 16,710 | 1,233 | - | - | 713 | - | - | - | 36,724 | 16,615 | 136,450 |
| PERIOD 1 TOTALS | | 2,873 | 2,846 | 134 | 212 | - | 546 | 92,207 | 14,777 | 113,594 | 107,126 | 6,468 | - | - | 2,134 | - | - | - | 84,593 | 33,743 | 853,167 |
| PERIOD 2a - SAFSTOR Dormancy with Wet Spent Fuel Storage | | | | | | | | | | | | | | | | | | | | | |
| Period 2a Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| 2a.1.1 | Quarterly Inspection | - | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - |
| 2a.1.2 | Semi-annual environmental survey | - | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - |
| 2a.1.3 | Prepare reports | - | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - |
| 2a.1.4 | Bituminous roof replacement | - | - | - | - | - | - | 54 | 8 | 62 | 62 | - | - | - | - | - | - | - | - | - | - |
| 2a.1.5 | Maintenance supplies | - | - | - | - | - | - | 520 | 130 | 650 | 650 | - | - | - | - | - | - | - | - | - | - |
| 2a.1 | Subtotal Period 2a Activity Costs | - | - | - | - | - | - | 574 | 138 | 712 | 712 | - | - | - | - | - | - | - | - | - | - |
| Period 2a Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 2a.2.1 | Security Modifications | - | - | - | - | - | - | 4,348 | 652 | 5,000 | 5,000 | - | - | - | - | - | - | - | - | - | - |
| 2a.2 | Subtotal Period 2a Additional Costs | - | - | - | - | - | - | 4,348 | 652 | 5,000 | 5,000 | - | - | - | - | - | - | - | - | - | - |
| Period 2a Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 2a.3.1 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 60,919 | 9,138 | 70,057 | - | 70,057 | - | - | - | - | - | - | - | - | - |
| 2a.3.2 | Retention and Severance | - | - | - | - | - | - | 22,434 | 3,365 | 25,799 | 25,799 | - | - | - | - | - | - | - | - | - | - |
| 2a.3.3 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 4,654 | - | 4,654 | - | 4,654 | - | - | - | - | - | - | - | - | - |
| 2a.3 | Subtotal Period 2a Collateral Costs | - | - | - | - | - | - | 88,007 | 12,503 | 100,510 | 25,799 | 74,712 | - | - | - | - | - | - | - | - | - |
| Period 2a Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 2a.4.1 | Insurance | - | - | - | - | - | - | 1,804 | 180 | 1,985 | 1,985 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.2 | Property taxes | - | - | - | - | - | - | 13,489 | 1,349 | 14,838 | 14,838 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.3 | Health physics supplies | - | 801 | - | - | - | - | - | 200 | 1,001 | 1,001 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.4 | Disposal of DAW generated | - | - | 14 | 6 | - | 59 | - | 17 | 96 | 96 | - | - | 714 | - | - | - | - | 14,273 | 23 | - |
| 2a.4.5 | Plant energy budget | - | - | - | - | - | - | 1,208 | 181 | 1,389 | 1,389 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.6 | NRC Fees | - | - | - | - | - | - | 908 | 91 | 999 | 999 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.7 | Emergency Planning Fees | - | - | - | - | - | - | 6,924 | 692 | 7,616 | - | 7,616 | - | - | - | - | - | - | - | - | - |
| 2a.4.8 | Fixed Overhead | - | - | - | - | - | - | 4,432 | 665 | 5,097 | 5,097 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.9 | Spent Fuel Pool O&M | - | - | - | - | - | - | 1,573 | 236 | 1,809 | - | 1,809 | - | - | - | - | - | - | - | - | - |
| 2a.4.10 | ISFSI Operating Costs | - | - | - | - | - | - | 209 | 31 | 240 | - | 240 | - | - | - | - | - | - | - | - | - |
| 2a.4.11 | Railroad Track Maintenance | - | - | - | - | - | - | 462 | 69 | 531 | - | 531 | - | - | - | - | - | - | - | - | - |
| 2a.4.12 | Security Staff Cost | - | - | - | - | - | - | 29,334 | 4,400 | 33,734 | 24,289 | 9,446 | - | - | - | - | - | - | - | - | 431,215 |
| 2a.4.13 | Utility Staff Cost | - | - | - | - | - | - | 3,645 | 547 | 4,192 | 3,517 | 675 | - | - | - | - | - | - | - | - | 58,126 |
| 2a.4 | Subtotal Period 2a Period-Dependent Costs | - | 801 | 14 | 6 | - | 59 | 63,988 | 8,659 | 73,527 | 53,741 | 19,786 | - | 714 | - | - | - | - | 14,273 | 23 | 489,341 |
| 2a.0 | TOTAL PERIOD 2a COST | - | 801 | 14 | 6 | - | 59 | 156,917 | 21,952 | 179,749 | 85,251 | 94,498 | - | 714 | - | - | - | - | 14,273 | 23 | 489,341 |
| PERIOD 2b - SAFSTOR Dormancy with Dry Spent Fuel Storage | | | | | | | | | | | | | | | | | | | | | |
| Period 2b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| 2b.1.1 | Quarterly Inspection | - | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - |
| 2b.1.2 | Semi-annual environmental survey | - | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - |
| 2b.1.3 | Prepare reports | - | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - |
| 2b.1.4 | Bituminous roof replacement | - | - | - | - | - | - | 524 | 79 | 602 | 602 | - | - | - | - | - | - | - | - | - | - |
| 2b.1.5 | Maintenance supplies | - | - | - | - | - | - | 5,052 | 1,263 | 6,315 | 6,315 | - | - | - | - | - | - | - | - | - | - |
| 2b.1 | Subtotal Period 2b Activity Costs | - | - | - | - | - | - | 5,575 | 1,342 | 6,917 | 6,917 | - | - | - | - | - | - | - | - | - | - |
| Period 2b Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 2b.3.1 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 15,884 | 2,383 | 18,267 | - | 18,267 | - | - | - | - | - | - | - | - | - |
| 2b.3.2 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 45,219 | - | 45,219 | - | 45,219 | - | - | - | - | - | - | - | - | - |
| 2b.3 | Subtotal Period 2b Collateral Costs | - | - | - | - | - | - | 61,103 | 2,383 | 63,486 | - | 63,486 | - | - | - | - | - | - | - | - | - |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table G-1
Prairie Island SAFSTOR Unit 1
SAFSTOR Decommissioning Cost Estimate with DOE Pickup of Industry Spent Fuel Starting in 2035
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|--|--|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|-----------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| Period 2b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 2b.4.1 | Insurance | - | - | - | - | - | - | 17,530 | 1,753 | 19,283 | 19,283 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.2 | Property taxes | - | - | - | - | - | - | 131,056 | 13,106 | 144,162 | 144,162 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.3 | Health physics supplies | - | 4,112 | - | - | - | - | - | 1,028 | 5,140 | 5,140 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.4 | Disposal of DAW generated | - | - | 74 | 30 | - | 308 | - | 89 | 501 | 501 | - | - | - | 3,739 | - | - | - | - | 74,786 | 122 | - |
| 2b.4.5 | Plant energy budget | - | - | - | - | - | - | 5,869 | 880 | 6,749 | 6,749 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.6 | NRC Fees | - | - | - | - | - | - | 8,234 | 823 | 9,058 | 9,058 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.7 | Emergency Planning Fees | - | - | - | - | - | - | 2,684 | 268 | 2,952 | - | 2,952 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.8 | Fixed Overhead | - | - | - | - | - | - | 5,898 | 885 | 6,783 | 6,783 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.9 | ISFSI Operating Costs | - | - | - | - | - | - | 2,026 | 304 | 2,330 | - | 2,330 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.10 | Railroad Track Maintenance | - | - | - | - | - | - | 2,263 | 339 | 2,603 | 2,603 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.11 | Security Staff Cost | - | - | - | - | - | - | 101,034 | 15,155 | 116,189 | 25,562 | 90,627 | - | - | - | - | - | - | - | - | - | 1,355,328 |
| 2b.4.12 | Utility Staff Cost | - | - | - | - | - | - | 49,438 | 7,416 | 56,854 | 35,704 | 21,150 | - | - | - | - | - | - | - | - | - | 752,960 |
| 2b.4 | Subtotal Period 2b Period-Dependent Costs | - | 4,112 | 74 | 30 | - | 308 | 326,032 | 42,046 | 372,602 | 255,544 | 117,059 | - | - | 3,739 | - | - | - | - | 74,786 | 122 | 2,108,288 |
| 2b.0 | TOTAL PERIOD 2b COST | - | 4,112 | 74 | 30 | - | 308 | 392,710 | 45,771 | 443,005 | 262,461 | 180,544 | - | - | 3,739 | - | - | - | - | 74,786 | 122 | 2,108,288 |
| PERIOD 2c - SAFSTOR Dormancy without Spent Fuel Storage | | | | | | | | | | | | | | | | | | | | | | |
| Period 2c Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| 2c.1.1 | Quarterly Inspection | - | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 2c.1.2 | Semi-annual environmental survey | - | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 2c.1.3 | Prepare reports | - | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 2c.1.4 | Bituminous roof replacement | - | - | - | - | - | - | 180 | 27 | 207 | 207 | - | - | - | - | - | - | - | - | - | - | - |
| 2c.1.5 | Maintenance supplies | - | - | - | - | - | - | 1,740 | 435 | 2,176 | 2,176 | - | - | - | - | - | - | - | - | - | - | - |
| 2c.1 | Subtotal Period 2c Activity Costs | - | - | - | - | - | - | 1,921 | 462 | 2,383 | 2,383 | - | - | - | - | - | - | - | - | - | - | - |
| Period 2c Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 2c.4.1 | Insurance | - | - | - | - | - | - | 3,484 | 348 | 3,833 | 3,833 | - | - | - | - | - | - | - | - | - | - | - |
| 2c.4.2 | Property taxes | - | - | - | - | - | - | 28,957 | 2,896 | 31,852 | 31,852 | - | - | - | - | - | - | - | - | - | - | - |
| 2c.4.3 | Health physics supplies | - | 1,401 | - | - | - | - | - | 350 | 1,752 | 1,752 | - | - | - | - | - | - | - | - | - | - | - |
| 2c.4.4 | Disposal of DAW generated | - | - | 25 | 10 | - | 105 | - | 30 | 170 | 170 | - | - | - | 1,269 | - | - | - | - | 25,389 | 41 | - |
| 2c.4.5 | Plant energy budget | - | - | - | - | - | - | 2,022 | 303 | 2,325 | 2,325 | - | - | - | - | - | - | - | - | - | - | - |
| 2c.4.6 | NRC Fees | - | - | - | - | - | - | 2,559 | 256 | 2,814 | 2,814 | - | - | - | - | - | - | - | - | - | - | - |
| 2c.4.7 | Fixed Overhead | - | - | - | - | - | - | 2,032 | 305 | 2,337 | 2,337 | - | - | - | - | - | - | - | - | - | - | - |
| 2c.4.8 | Railroad Track Maintenance | - | - | - | - | - | - | 780 | 117 | 897 | 897 | - | - | - | - | - | - | - | - | - | - | - |
| 2c.4.9 | Security Staff Cost | - | - | - | - | - | - | 29,821 | 4,473 | 34,295 | 34,295 | - | - | - | - | - | - | - | - | - | - | 389,103 |
| 2c.4.10 | Utility Staff Cost | - | - | - | - | - | - | 14,461 | 2,169 | 16,630 | 16,630 | - | - | - | - | - | - | - | - | - | - | 226,977 |
| 2c.4 | Subtotal Period 2c Period-Dependent Costs | - | 1,401 | 25 | 10 | - | 105 | 84,116 | 11,248 | 96,905 | 96,905 | - | - | - | 1,269 | - | - | - | - | 25,389 | 41 | 616,079 |
| 2c.0 | TOTAL PERIOD 2c COST | - | 1,401 | 25 | 10 | - | 105 | 86,036 | 11,710 | 99,288 | 99,288 | - | - | - | 1,269 | - | - | - | - | 25,389 | 41 | 616,079 |
| PERIOD 2 TOTALS | | | | | | | | | | | | | | | | | | | | | | |
| - | - | - | 6,314 | 113 | 46 | - | 472 | 635,664 | 79,433 | 722,042 | 447,000 | 275,042 | - | - | 5,722 | - | - | - | - | 114,448 | 187 | 3,213,708 |
| PERIOD 3a - Reactivate Site Following SAFSTOR Dormancy | | | | | | | | | | | | | | | | | | | | | | |
| Period 3a Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| 3a.1.1 | Prepare preliminary decommissioning cost | - | - | - | - | - | - | 167 | 25 | 192 | 192 | - | - | - | - | - | - | - | - | - | - | 1,300 |
| 3a.1.2 | Review plant dwgs & specs. | - | - | - | - | - | - | 591 | 89 | 680 | 680 | - | - | - | - | - | - | - | - | - | - | 4,600 |
| 3a.1.3 | Perform detailed rad survey | - | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 3a.1.4 | End product description | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | - | 1,000 |
| 3a.1.5 | Detailed by-product inventory | - | - | - | - | - | - | 167 | 25 | 192 | 192 | - | - | - | - | - | - | - | - | - | - | 1,300 |
| 3a.1.6 | Define major work sequence | - | - | - | - | - | - | 964 | 145 | 1,108 | 1,108 | - | - | - | - | - | - | - | - | - | - | 7,500 |
| 3a.1.7 | Perform SER and EA | - | - | - | - | - | - | 398 | 60 | 458 | 458 | - | - | - | - | - | - | - | - | - | - | 3,100 |
| 3a.1.8 | Prepare/submit Defueled Technical Specifications | - | - | - | - | - | - | 964 | 145 | 1,108 | 1,108 | - | - | - | - | - | - | - | - | - | - | 7,500 |
| 3a.1.9 | Perform Site-Specific Cost Study | - | - | - | - | - | - | 643 | 96 | 739 | 739 | - | - | - | - | - | - | - | - | - | - | 5,000 |
| 3a.1.10 | Prepare/submit Irradiated Fuel Management Plan | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | - | 1,000 |
| Activity Specifications | | | | | | | | | | | | | | | | | | | | | | |
| 3a.1.11.1 | Re-activate plant & temporary facilities | - | - | - | - | - | - | 947 | 142 | 1,089 | 980 | - | 109 | - | - | - | - | - | - | - | - | 7,370 |
| 3a.1.11.2 | Plant systems | - | - | - | - | - | - | 536 | 80 | 616 | 554 | - | 62 | - | - | - | - | - | - | - | - | 4,167 |
| 3a.1.11.3 | Reactor internals | - | - | - | - | - | - | 912 | 137 | 1,049 | 1,049 | - | - | - | - | - | - | - | - | - | - | 7,100 |
| 3a.1.11.4 | Reactor vessel | - | - | - | - | - | - | 835 | 125 | 961 | 961 | - | - | - | - | - | - | - | - | - | - | 6,500 |
| 3a.1.11.5 | Biological shield | - | - | - | - | - | - | 64 | 10 | 74 | 74 | - | - | - | - | - | - | - | - | - | - | 500 |
| 3a.1.11.6 | Steam generators | - | - | - | - | - | - | 401 | 60 | 461 | 461 | - | - | - | - | - | - | - | - | - | - | 3,120 |
| 3a.1.11.7 | Reinforced concrete | - | - | - | - | - | - | 206 | 31 | 236 | 118 | - | 118 | - | - | - | - | - | - | - | - | 1,600 |
| 3a.1.11.8 | Main Turbine | - | - | - | - | - | - | 51 | 8 | 59 | - | - | 59 | - | - | - | - | - | - | - | - | 400 |
| 3a.1.11.9 | Main Condensers | - | - | - | - | - | - | 51 | 8 | 59 | - | - | 59 | - | - | - | - | - | - | - | - | 400 |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table G-1
Prairie Island SAFSTOR Unit 1
SAFSTOR Decommissioning Cost Estimate with DOE Pickup of Industry Spent Fuel Starting in 2035
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|---------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| Activity Specifications (continued) | | | | | | | | | | | | | | | | | | | | | | |
| 3a.1.11.10 | Plant structures & buildings | - | - | - | - | - | - | 401 | 60 | 461 | 231 | - | 231 | - | - | - | - | - | - | - | - | 3,120 |
| 3a.1.11.11 | Waste management | - | - | - | - | - | - | 591 | 89 | 680 | 680 | - | - | - | - | - | - | - | - | - | - | 4,600 |
| 3a.1.11.12 | Facility & site closeout | - | - | - | - | - | - | 116 | 17 | 133 | 67 | - | 67 | - | - | - | - | - | - | - | - | 900 |
| 3a.1.11 | Total | - | - | - | - | - | - | 5,112 | 767 | 5,879 | 5,175 | - | 704 | - | - | - | - | - | - | - | - | 39,777 |
| Planning & Site Preparations | | | | | | | | | | | | | | | | | | | | | | |
| 3a.1.12 | Prepare dismantling sequence | - | - | - | - | - | - | 308 | 46 | 355 | 355 | - | - | - | - | - | - | - | - | - | - | 2,400 |
| 3a.1.13 | Plant prep. & temp. svces | - | - | - | - | - | - | 3,500 | 525 | 4,025 | 4,025 | - | - | - | - | - | - | - | - | - | - | - |
| 3a.1.14 | Design water clean-up system | - | - | - | - | - | - | 180 | 27 | 207 | 207 | - | - | - | - | - | - | - | - | - | - | 1,400 |
| 3a.1.15 | Rigging/Cont. Cntrl Envlps/tooling/etc. | - | - | - | - | - | - | 2,400 | 360 | 2,760 | 2,760 | - | - | - | - | - | - | - | - | - | - | - |
| 3a.1.16 | Procure casks/liners & containers | - | - | - | - | - | - | 158 | 24 | 182 | 182 | - | - | - | - | - | - | - | - | - | - | 1,230 |
| 3a.1 | Subtotal Period 3a Activity Costs | - | - | - | - | - | - | 15,810 | 2,371 | 18,181 | 17,477 | - | 704 | - | - | - | - | - | - | - | - | 77,107 |
| Period 3a Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3a.2.1 | Site Characterization | - | - | - | - | - | - | 3,520 | 1,056 | 4,576 | 4,576 | - | - | - | - | - | - | - | - | - | - | 21,020 |
| 3a.2.2 | Mixed/Hazardous Waste | - | - | 353 | 94 | 178 | - | - | 76 | 702 | 702 | - | - | 6,132 | - | - | - | - | - | 351,977 | 2,348 | - |
| 3a.2.3 | Asbestos Abatement | - | 2,526 | 3 | 150 | - | 1,369 | - | 996 | 5,044 | 5,044 | - | - | - | 12,843 | - | - | - | - | 166,959 | 20,907 | - |
| 3a.2 | Subtotal Period 3a Additional Costs | - | 2,526 | 356 | 244 | 178 | 1,369 | 3,520 | 2,129 | 10,321 | 10,321 | - | - | 6,132 | 12,843 | - | - | - | - | 518,936 | 44,275 | 8,332 |
| Period 3a Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3a.3.1 | Small tool allowance | - | 34 | - | - | - | - | - | 5 | 39 | 39 | - | - | - | - | - | - | - | - | - | - | - |
| 3a.3 | Subtotal Period 3a Collateral Costs | - | 34 | - | - | - | - | - | 5 | 39 | 39 | - | - | - | - | - | - | - | - | - | - | - |
| Period 3a Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3a.4.1 | Insurance | - | - | - | - | - | - | 279 | 28 | 307 | 307 | - | - | - | - | - | - | - | - | - | - | - |
| 3a.4.2 | Property taxes | - | - | - | - | - | - | 2,320 | 232 | 2,553 | 2,553 | - | - | - | - | - | - | - | - | - | - | - |
| 3a.4.3 | Health physics supplies | - | 669 | - | - | - | - | - | 167 | 836 | 836 | - | - | - | - | - | - | - | - | - | - | - |
| 3a.4.4 | Heavy equipment rental | - | 753 | - | - | - | - | - | 113 | 866 | 866 | - | - | - | - | - | - | - | - | - | - | - |
| 3a.4.5 | Disposal of DAW generated | - | - | 10 | 4 | - | 42 | - | 12 | 69 | 69 | - | - | - | 514 | - | - | - | - | 10,287 | 17 | - |
| 3a.4.6 | Plant energy budget | - | - | - | - | - | - | 1,621 | 243 | 1,864 | 1,864 | - | - | - | - | - | - | - | - | - | - | - |
| 3a.4.7 | NRC Fees | - | - | - | - | - | - | 335 | 33 | 368 | 368 | - | - | - | - | - | - | - | - | - | - | - |
| 3a.4.8 | Fixed Overhead | - | - | - | - | - | - | 1,440 | 216 | 1,656 | 1,656 | - | - | - | - | - | - | - | - | - | - | - |
| 3a.4.9 | Railroad Track Maintenance | - | - | - | - | - | - | 63 | 9 | 72 | 72 | - | - | - | - | - | - | - | - | - | - | - |
| 3a.4.10 | Security Staff Cost | - | - | - | - | - | - | 4,386 | 658 | 5,044 | 5,044 | - | - | - | - | - | - | - | - | - | - | 65,000 |
| 3a.4.11 | Utility Staff Cost | - | - | - | - | - | - | 16,379 | 2,457 | 18,835 | 18,835 | - | - | - | - | - | - | - | - | - | - | 257,920 |
| 3a.4 | Subtotal Period 3a Period-Dependent Costs | - | 1,422 | 10 | 4 | - | 42 | 26,823 | 4,169 | 32,471 | 32,471 | - | - | - | 514 | - | - | - | - | 10,287 | 17 | 322,920 |
| 3a.0 | TOTAL PERIOD 3a COST | - | 3,982 | 366 | 248 | 178 | 1,411 | 46,153 | 8,674 | 61,013 | 60,308 | - | 704 | 6,132 | 13,357 | - | - | - | - | 529,223 | 44,292 | 408,359 |
| PERIOD 3b - Decommissioning Preparations | | | | | | | | | | | | | | | | | | | | | | |
| Period 3b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Detailed Work Procedures | | | | | | | | | | | | | | | | | | | | | | |
| 3b.1.1.1 | Plant systems | - | - | - | - | - | - | 608 | 91 | 700 | 630 | - | 70 | - | - | - | - | - | - | - | - | 4,733 |
| 3b.1.1.2 | Reactor internals | - | - | - | - | - | - | 321 | 48 | 369 | 369 | - | - | - | - | - | - | - | - | - | - | 2,500 |
| 3b.1.1.3 | Remaining buildings | - | - | - | - | - | - | 174 | 26 | 200 | 50 | - | 150 | - | - | - | - | - | - | - | - | 1,350 |
| 3b.1.1.4 | CRD cooling assembly | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | - | 1,000 |
| 3b.1.1.5 | CRD housings & ICI tubes | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | - | 1,000 |
| 3b.1.1.6 | Incore instrumentation | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | - | 1,000 |
| 3b.1.1.7 | Reactor vessel | - | - | - | - | - | - | 467 | 70 | 537 | 537 | - | - | - | - | - | - | - | - | - | - | 3,630 |
| 3b.1.1.8 | Facility closeout | - | - | - | - | - | - | 154 | 23 | 177 | 89 | - | 89 | - | - | - | - | - | - | - | - | 1,200 |
| 3b.1.1.9 | Missile shields | - | - | - | - | - | - | 58 | 9 | 67 | 67 | - | - | - | - | - | - | - | - | - | - | 450 |
| 3b.1.1.10 | Biological shield | - | - | - | - | - | - | 154 | 23 | 177 | 177 | - | - | - | - | - | - | - | - | - | - | 1,200 |
| 3b.1.1.11 | Steam generators | - | - | - | - | - | - | 591 | 89 | 680 | 680 | - | - | - | - | - | - | - | - | - | - | 4,600 |
| 3b.1.1.12 | Reinforced concrete | - | - | - | - | - | - | 129 | 19 | 148 | 74 | - | 74 | - | - | - | - | - | - | - | - | 1,000 |
| 3b.1.1.13 | Main Turbine | - | - | - | - | - | - | 200 | 30 | 231 | - | - | 231 | - | - | - | - | - | - | - | - | 1,560 |
| 3b.1.1.14 | Main Condensers | - | - | - | - | - | - | 200 | 30 | 231 | - | - | 231 | - | - | - | - | - | - | - | - | 1,560 |
| 3b.1.1.15 | Auxiliary building | - | - | - | - | - | - | 351 | 53 | 403 | 363 | - | 40 | - | - | - | - | - | - | - | - | 2,730 |
| 3b.1.1.16 | Reactor building | - | - | - | - | - | - | 351 | 53 | 403 | 363 | - | 40 | - | - | - | - | - | - | - | - | 2,730 |
| 3b.1.1 | Total | - | - | - | - | - | - | 4,144 | 622 | 4,765 | 3,841 | - | 924 | - | - | - | - | - | - | - | - | 32,243 |
| 3b.1 | Subtotal Period 3b Activity Costs | - | - | - | - | - | - | 4,144 | 622 | 4,765 | 3,841 | - | 924 | - | - | - | - | - | - | - | - | 32,243 |
| Period 3b Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3b.3.1 | Decon equipment | 1,055 | - | - | - | - | - | - | 158 | 1,213 | 1,213 | - | - | - | - | - | - | - | - | - | - | - |
| 3b.3.2 | DOC staff relocation expenses | - | - | - | - | - | - | 1,264 | 190 | 1,454 | 1,454 | - | - | - | - | - | - | - | - | - | - | - |
| 3b.3.3 | Pipe cutting equipment | - | 1,200 | - | - | - | - | - | 180 | 1,380 | 1,380 | - | - | - | - | - | - | - | - | - | - | - |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table G-1
Prairie Island SAFSTOR Unit 1
SAFSTOR Decommissioning Cost Estimate with DOE Pickup of Industry Spent Fuel Starting in 2035
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|--|---|--------------|--------------|-----------------|-----------------|---------------------------|---------------------|---------------|-------------------|---------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|----------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| 3b.3 | Subtotal Period 3b Collateral Costs | 1,055 | 1,200 | - | - | - | - | 1,264 | 528 | 4,047 | 4,047 | - | - | - | - | - | - | - | - | - | - | - |
| Period 3b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3b.4.1 | Decon supplies | 38 | - | - | - | - | - | - | 9 | 47 | 47 | - | - | - | - | - | - | - | - | - | - | |
| 3b.4.2 | Insurance | - | - | - | - | - | - | 241 | 24 | 266 | 266 | - | - | - | - | - | - | - | - | - | - | |
| 3b.4.3 | Property taxes | - | - | - | - | - | - | 1,155 | 116 | 1,271 | 1,271 | - | - | - | - | - | - | - | - | - | - | |
| 3b.4.4 | Health physics supplies | - | 295 | - | - | - | - | - | 74 | 369 | 369 | - | - | - | - | - | - | - | - | - | - | |
| 3b.4.5 | Heavy equipment rental | - | 375 | - | - | - | - | - | 56 | 432 | 432 | - | - | - | - | - | - | - | - | - | - | |
| 3b.4.6 | Disposal of DAW generated | - | - | 6 | 2 | - | 24 | - | 7 | 39 | 39 | - | - | - | 290 | - | - | - | - | 5,802 | 9 | |
| 3b.4.7 | Plant energy budget | - | - | - | - | - | - | 808 | 121 | 930 | 930 | - | - | - | - | - | - | - | - | - | - | |
| 3b.4.8 | NRC Fees | - | - | - | - | - | - | 167 | 17 | 183 | 183 | - | - | - | - | - | - | - | - | - | - | |
| 3b.4.9 | Fixed Overhead | - | - | - | - | - | - | 718 | 108 | 826 | 826 | - | - | - | - | - | - | - | - | - | - | |
| 3b.4.10 | Railroad Track Maintenance | - | - | - | - | - | - | 31 | 5 | 36 | 36 | - | - | - | - | - | - | - | - | - | - | |
| 3b.4.11 | Security Staff Cost | - | - | - | - | - | - | 2,187 | 328 | 2,515 | 2,515 | - | - | - | - | - | - | - | - | - | 32,411 | |
| 3b.4.12 | DOC Staff Cost | - | - | - | - | - | - | 5,344 | 802 | 6,146 | 6,146 | - | - | - | - | - | - | - | - | - | 58,080 | |
| 3b.4.13 | Utility Staff Cost | - | - | - | - | - | - | 8,167 | 1,225 | 9,392 | 9,392 | - | - | - | - | - | - | - | - | - | 128,607 | |
| 3b.4 | Subtotal Period 3b Period-Dependent Costs | 38 | 670 | 6 | 2 | - | 24 | 18,820 | 2,891 | 22,450 | 22,450 | - | - | - | 290 | - | - | - | - | 5,802 | 9 | 219,098 |
| 3b.0 | TOTAL PERIOD 3b COST | 1,092 | 1,870 | 6 | 2 | - | 24 | 24,227 | 4,040 | 31,262 | 30,338 | - | 924 | - | 290 | - | - | - | - | 5,802 | 9 | 251,341 |
| PERIOD 3 TOTALS | | 1,092 | 5,852 | 372 | 251 | 178 | 1,435 | 70,380 | 12,715 | 92,275 | 90,647 | - | 1,628 | 6,132 | 13,647 | - | - | - | - | 535,025 | 44,301 | 659,700 |
| PERIOD 4a - Large Component Removal | | | | | | | | | | | | | | | | | | | | | | |
| Period 4a Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Nuclear Steam Supply System Removal | | | | | | | | | | | | | | | | | | | | | | |
| 4a.1.1.1 | Reactor Coolant Piping | 11 | 42 | 10 | 11 | 66 | 94 | - | 52 | 285 | 285 | - | - | 240 | 254 | - | - | - | - | 33,680 | 778 | - |
| 4a.1.1.2 | Pressurizer Relief Tank | 5 | 19 | 6 | 7 | 44 | 62 | - | 31 | 174 | 174 | - | - | 160 | 169 | - | - | - | - | 22,441 | 352 | - |
| 4a.1.1.3 | Reactor Coolant Pumps & Motors | 13 | 60 | 46 | 85 | - | 463 | - | 155 | 822 | 822 | - | - | - | 2,332 | - | - | - | - | 295,800 | 1,226 | 80 |
| 4a.1.1.4 | Pressurizer | - | 77 | 382 | 91 | - | 776 | - | 265 | 1,591 | 1,591 | - | - | - | 2,196 | - | - | - | - | 158,199 | 1,346 | 750 |
| 4a.1.1.5 | Steam Generators | - | 3,307 | 1,690 | 1,743 | 2,409 | 3,885 | - | 2,590 | 15,625 | 15,625 | - | - | 18,672 | 10,990 | - | - | - | - | 1,581,180 | 10,253 | 2,250 |
| 4a.1.1.6 | CRDMs/ICIs/Service Structure Removal | 63 | 248 | 205 | 44 | 326 | 454 | - | 283 | 1,623 | 1,623 | - | - | 2,138 | 2,146 | - | - | - | - | 165,025 | 4,449 | - |
| 4a.1.1.7 | Reactor Vessel Internals | 53 | 4,650 | 11,331 | 828 | - | 8,610 | 278 | 10,900 | 36,649 | 36,649 | - | - | - | 1,174 | - | 742 | - | - | 167,605 | 22,373 | 1,053 |
| 4a.1.1.8 | Vessel & Internals GTCC Disposal | - | - | - | - | - | 8,680 | - | 1,302 | 9,982 | 9,982 | - | - | - | - | - | - | 1,773 | - | 344,823 | - | - |
| 4a.1.1.9 | Reactor Vessel | - | 5,835 | 1,653 | 442 | - | 3,268 | 278 | 6,576 | 18,053 | 18,053 | - | - | - | 9,245 | - | - | - | - | 579,324 | 22,373 | 1,053 |
| 4a.1.1 | Totals | 146 | 14,237 | 15,324 | 3,250 | 2,845 | 26,293 | 556 | 22,154 | 84,804 | 84,804 | - | - | 21,210 | 28,505 | - | 742 | 1,773 | - | 3,348,078 | 63,151 | 5,187 |
| Removal of Major Equipment | | | | | | | | | | | | | | | | | | | | | | |
| 4a.1.2 | Main Turbine/Generator | - | 292 | 116 | 35 | 555 | - | - | 173 | 1,170 | 1,170 | - | - | 2,243 | - | - | - | - | - | 134,601 | 4,116 | - |
| 4a.1.3 | Main Condensers | - | 2,510 | 79 | 33 | 742 | - | - | 752 | 4,115 | 4,115 | - | - | 4,000 | - | - | - | - | - | 180,000 | 34,978 | - |
| Cascading Costs from Clean Building Demolition | | | | | | | | | | | | | | | | | | | | | | |
| 4a.1.4.1 | Reactor | - | 794 | - | - | - | - | - | 119 | 913 | 913 | - | - | - | - | - | - | - | - | - | 7,589 | - |
| 4a.1.4 | Totals | - | 794 | - | - | - | - | - | 119 | 913 | 913 | - | - | - | - | - | - | - | - | - | 7,589 | - |
| Disposal of Plant Systems | | | | | | | | | | | | | | | | | | | | | | |
| 4a.1.5.1 | Air Removal | - | 31 | - | - | - | - | - | 5 | 36 | - | - | 36 | - | - | - | - | - | - | - | 452 | - |
| 4a.1.5.2 | Auxiliary Feedwater | - | 46 | - | - | - | - | - | 7 | 53 | - | - | 53 | - | - | - | - | - | - | - | 670 | - |
| 4a.1.5.3 | Auxiliary Feedwater - RCA | - | 47 | 0 | 2 | 36 | - | - | 17 | 102 | 102 | - | - | 215 | - | - | - | - | - | 8,722 | 601 | - |
| 4a.1.5.4 | Bleed Steam | - | 90 | - | - | - | - | - | 14 | 104 | - | - | 104 | - | - | - | - | - | - | - | 1,335 | - |
| 4a.1.5.5 | Caustic Addition - RCA | - | 38 | 0 | 2 | 39 | - | - | 16 | 95 | 95 | - | - | 233 | - | - | - | - | - | 9,453 | 444 | - |
| 4a.1.5.6 | Chemical Feed | - | 20 | - | - | - | - | - | 3 | 23 | - | - | 23 | - | - | - | - | - | - | - | 304 | - |
| 4a.1.5.7 | Chemical Feed - RCA | - | 1 | 0 | 0 | 1 | - | - | 0 | 3 | 3 | - | - | 6 | - | - | - | - | - | 243 | 12 | - |
| 4a.1.5.8 | Circulating Water | - | 42 | - | - | - | - | - | 6 | 49 | - | - | 49 | - | - | - | - | - | - | - | 619 | - |
| 4a.1.5.9 | Condensate | - | 474 | - | - | - | - | - | 71 | 545 | - | - | 545 | - | - | - | - | - | - | - | 6,837 | - |
| 4a.1.5.10 | Condensate Polishing | - | 235 | - | - | - | - | - | 35 | 271 | - | - | 271 | - | - | - | - | - | - | - | 3,420 | - |
| 4a.1.5.11 | Condensate Polishing - RCA | - | 183 | 4 | 15 | 348 | - | - | 101 | 651 | 651 | - | - | 2,078 | - | - | - | - | - | 84,395 | 2,329 | - |
| 4a.1.5.12 | Electro-hydraulic | - | 9 | - | - | - | - | - | 1 | 10 | - | - | 10 | - | - | - | - | - | - | - | 127 | - |
| 4a.1.5.13 | Feedwater | - | 153 | - | - | - | - | - | 23 | 175 | - | - | 175 | - | - | - | - | - | - | - | 2,215 | - |
| 4a.1.5.14 | Feedwater - RCA | - | 195 | 7 | 24 | 537 | - | - | 133 | 895 | 895 | - | - | 3,208 | - | - | - | - | - | 130,294 | 2,651 | - |
| 4a.1.5.15 | Gland Seal | - | 34 | - | - | - | - | - | 5 | 39 | - | - | 39 | - | - | - | - | - | - | - | 505 | - |
| 4a.1.5.16 | Heater Drain | - | 400 | - | - | - | - | - | 60 | 460 | - | - | 460 | - | - | - | - | - | - | - | 5,881 | - |
| 4a.1.5.17 | Internal Circ Water & CDSR | - | 27 | - | - | - | - | - | 4 | 31 | - | - | 31 | - | - | - | - | - | - | - | 389 | - |
| 4a.1.5.18 | Main Gen/Exciter/Transformer | - | 0 | - | - | - | - | - | 0 | 0 | - | - | 0 | - | - | - | - | - | - | - | 5 | - |
| 4a.1.5.19 | Main Steam | - | 115 | - | - | - | - | - | 17 | 133 | - | - | 133 | - | - | - | - | - | - | - | 1,690 | - |
| 4a.1.5.20 | Main Steam - RCA | - | 366 | 10 | 37 | 844 | - | - | 225 | 1,482 | 1,482 | - | - | 5,044 | - | - | - | - | - | 204,825 | 4,956 | - |
| 4a.1.5.21 | Steam Generator Blowdown | - | 434 | 22 | 29 | 340 | 234 | - | 224 | 1,282 | 1,282 | - | - | 2,031 | 686 | - | - | - | - | 126,640 | 5,974 | - |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table G-1
Prairie Island SAFSTOR Unit 1
SAFSTOR Decommissioning Cost Estimate with DOE Pickup of Industry Spent Fuel Starting in 2035
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|---------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| Disposal of Plant Systems (continued) | | | | | | | | | | | | | | | | | | | | | | |
| 4a.1.5.22 | Steam Generators | - | 5 | - | - | - | - | - | 1 | 6 | - | - | 6 | - | - | - | - | - | - | - | 75 | - |
| 4a.1.5.23 | Turbine & Moisture Separators | - | 386 | - | - | - | - | - | 58 | 444 | - | - | 444 | - | - | - | - | - | - | - | 5,609 | - |
| 4a.1.5.24 | Turbine Oil Purification | - | 70 | - | - | - | - | - | 11 | 81 | - | - | 81 | - | - | - | - | - | - | - | 1,003 | - |
| 4a.1.5 | Totals | - | 3,401 | 44 | 108 | 2,144 | 234 | - | 1,037 | 6,967 | 4,510 | - | 2,458 | 12,815 | 686 | - | - | - | - | 564,572 | 48,101 | - |
| 4a.1.6 | Scaffolding in support of decommissioning | - | 909 | 3 | 1 | 26 | 4 | - | 233 | 1,176 | 1,176 | - | - | 138 | 12 | - | - | - | - | 6,985 | 6,020 | - |
| 4a.1 | Subtotal Period 4a Activity Costs | 146 | 22,144 | 15,566 | 3,426 | 6,311 | 26,530 | 556 | 24,467 | 99,147 | 96,689 | - | 2,458 | 40,406 | 29,203 | - | 742 | 1,773 | 4,234,235 | 163,954 | 5,187 | - |
| Period 4a Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 4a.2.1 | Retired RPV upper internals package | - | 128 | 166 | 58 | - | 1,583 | - | 944 | 2,879 | 2,879 | - | - | - | 572 | 125 | - | - | - | 49,800 | 1,667 | 67 |
| 4a.2 | Subtotal Period 4a Additional Costs | - | 128 | 166 | 58 | - | 1,583 | - | 944 | 2,879 | 2,879 | - | - | - | 572 | 125 | - | - | - | 49,800 | 1,667 | 67 |
| Period 4a Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 4a.3.1 | Process decommissioning water waste | 2 | - | 4 | 8 | - | 17 | - | 7 | 38 | 38 | - | - | - | 39 | - | - | - | - | 2,337 | 8 | - |
| 4a.3.3 | Small tool allowance | - | 213 | - | - | - | - | - | 32 | 245 | 220 | - | 24 | - | - | - | - | - | - | - | - | - |
| 4a.3 | Subtotal Period 4a Collateral Costs | 2 | 213 | 4 | 8 | - | 17 | - | 39 | 283 | 258 | - | 24 | - | 39 | - | - | - | - | 2,337 | 8 | - |
| Period 4a Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 4a.4.1 | Decon supplies | 100 | - | - | - | - | - | - | 25 | 125 | 125 | - | - | - | - | - | - | - | - | - | - | - |
| 4a.4.2 | Insurance | - | - | - | - | - | - | 643 | 64 | 708 | 708 | - | - | - | - | - | - | - | - | - | - | - |
| 4a.4.3 | Property taxes | - | - | - | - | - | - | 2,715 | 272 | 2,987 | 2,987 | - | - | - | - | - | - | - | - | - | - | - |
| 4a.4.4 | Health physics supplies | - | 1,743 | - | - | - | - | - | 436 | 2,179 | 2,179 | - | - | - | - | - | - | - | - | - | - | - |
| 4a.4.5 | Heavy equipment rental | - | 3,325 | - | - | - | - | - | 499 | 3,824 | 3,824 | - | - | - | - | - | - | - | - | - | - | - |
| 4a.4.6 | Disposal of DAW generated | - | - | 59 | 24 | - | 245 | - | 71 | 398 | 398 | - | - | - | 2,971 | - | - | - | - | 59,418 | 97 | - |
| 4a.4.7 | Plant energy budget | - | - | - | - | - | - | 2,047 | 307 | 2,354 | 2,354 | - | - | - | - | - | - | - | - | - | - | - |
| 4a.4.8 | NRC Fees | - | - | - | - | - | - | 643 | 64 | 707 | 707 | - | - | - | - | - | - | - | - | - | - | - |
| 4a.4.9 | Fixed Overhead | - | - | - | - | - | - | 1,581 | 237 | 1,818 | 1,818 | - | - | - | - | - | - | - | - | - | - | - |
| 4a.4.10 | Liquid Radwaste Processing Equipment/Services | - | - | - | - | - | - | 565 | 85 | 649 | 649 | - | - | - | - | - | - | - | - | - | - | - |
| 4a.4.11 | Railroad Track Maintenance | - | - | - | - | - | - | 83 | 12 | 96 | 96 | - | - | - | - | - | - | - | - | - | - | - |
| 4a.4.12 | Remedial Actions Surveys | - | - | - | - | - | - | 1,489 | 223 | 1,712 | 1,712 | - | - | - | - | - | - | - | - | - | - | - |
| 4a.4.13 | Security Staff Cost | - | - | - | - | - | - | 5,167 | 775 | 5,943 | 5,943 | - | - | - | - | - | - | - | - | - | - | 76,832 |
| 4a.4.14 | DOC Staff Cost | - | - | - | - | - | - | 17,190 | 2,579 | 19,769 | 19,769 | - | - | - | - | - | - | - | - | - | - | 189,964 |
| 4a.4.15 | Utility Staff Cost | - | - | - | - | - | - | 21,633 | 3,245 | 24,877 | 24,877 | - | - | - | - | - | - | - | - | - | - | 340,664 |
| 4a.4 | Subtotal Period 4a Period-Dependent Costs | 100 | 5,068 | 59 | 24 | - | 245 | 53,755 | 8,894 | 68,145 | 68,145 | - | - | - | 2,971 | - | - | - | - | 59,418 | 97 | 607,460 |
| 4a.0 | TOTAL PERIOD 4a COST | 248 | 27,553 | 15,796 | 3,516 | 6,311 | 28,375 | 54,311 | 34,343 | 170,454 | 167,972 | - | 2,482 | 40,406 | 32,785 | 125 | 742 | 1,773 | 4,345,791 | 165,725 | 612,713 | - |
| PERIOD 4b - Site Decontamination | | | | | | | | | | | | | | | | | | | | | | |
| Period 4b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| 4b.1.1 | Remove spent fuel racks | 314 | 35 | 86 | 41 | - | 703 | - | 356 | 1,535 | 1,535 | - | - | - | 2,092 | - | - | - | - | 132,919 | 576 | - |
| Disposal of Plant Systems | | | | | | | | | | | | | | | | | | | | | | |
| 4b.1.2.1 | Aux Bldg Normal Ventilation | - | 2 | 0 | 0 | 1 | - | - | 1 | 3 | 3 | - | - | 3 | - | - | - | - | - | 140 | 26 | - |
| 4b.1.2.3 | Buildings Maintenance | - | 5 | - | - | - | - | - | 1 | 5 | - | - | 5 | - | - | - | - | - | - | - | 65 | - |
| 4b.1.2.4 | Chemical & Volume Control | - | 1,263 | 89 | 90 | 753 | 973 | - | 694 | 3,861 | 3,861 | - | - | 4,498 | 2,846 | - | - | - | - | 366,565 | 17,235 | - |
| 4b.1.2.5 | Component Cooling - RCA | - | 858 | 25 | 91 | 2,079 | - | - | 543 | 3,597 | 3,597 | - | - | 12,427 | - | - | - | - | - | 504,675 | 11,242 | - |
| 4b.1.2.6 | Containment Cooling | - | 74 | - | - | - | - | - | 11 | 85 | - | - | 85 | - | - | - | - | - | - | - | 1,086 | - |
| 4b.1.2.7 | Containment Cooling - RCA | - | 304 | 7 | 25 | 569 | - | - | 166 | 1,070 | 1,070 | - | - | 3,400 | - | - | - | - | - | 138,090 | 3,971 | - |
| 4b.1.2.8 | Containment Hydrogen Control - RCA | - | 30 | 0 | 1 | 18 | - | - | 10 | 59 | 59 | - | - | 105 | - | - | - | - | - | 4,278 | 401 | - |
| 4b.1.2.9 | Containment Spray - RCA | - | 93 | 2 | 6 | 145 | - | - | 46 | 293 | 293 | - | - | 868 | - | - | - | - | - | 35,249 | 1,217 | - |
| 4b.1.2.10 | Containment Ventilation | - | 229 | 24 | 51 | 828 | 248 | - | 254 | 1,635 | 1,635 | - | - | 4,951 | 737 | - | - | - | - | 247,952 | 3,278 | - |
| 4b.1.2.11 | Cooling Water | - | 163 | - | - | - | - | - | 24 | 187 | - | - | 187 | - | - | - | - | - | - | - | 2,396 | - |
| 4b.1.2.12 | Cooling Water - RCA | - | 658 | 16 | 57 | 1,293 | - | - | 368 | 2,392 | 2,392 | - | - | 7,728 | - | - | - | - | - | 313,832 | 8,594 | - |
| 4b.1.2.13 | D1 Emergency Diesel | - | 50 | - | - | - | - | - | 8 | 58 | - | - | 58 | - | - | - | - | - | - | - | 730 | - |
| 4b.1.2.14 | D2 Emergency Diesel | - | 36 | - | - | - | - | - | 5 | 41 | - | - | 41 | - | - | - | - | - | - | - | 522 | - |
| 4b.1.2.15 | Diesel Rooms Ventilation | - | 9 | - | - | - | - | - | 1 | 11 | - | - | 11 | - | - | - | - | - | - | - | 135 | - |
| 4b.1.2.16 | Electrical - Clean | - | 1,905 | - | - | - | - | - | 286 | 2,191 | - | - | 2,191 | - | - | - | - | - | - | - | 26,981 | - |
| 4b.1.2.17 | Electrical - Contaminated | - | 553 | 7 | 20 | 423 | 32 | - | 213 | 1,248 | 1,248 | - | - | 2,527 | 95 | - | - | - | - | 108,690 | 7,488 | - |
| 4b.1.2.18 | Electrical - Contaminated - Fuel Pool | - | 137 | 2 | 5 | 103 | 8 | - | 53 | 307 | 307 | - | - | 615 | 23 | - | - | - | - | 26,449 | 1,857 | - |
| 4b.1.2.19 | Electrical - Decontaminated | - | 3,787 | 48 | 173 | 3,940 | - | - | 1,569 | 9,518 | 9,518 | - | - | 23,551 | - | - | - | - | - | 956,401 | 49,378 | - |
| 4b.1.2.20 | Electrical - Decontaminated - Fuel Pool | - | 947 | 12 | 43 | 986 | - | - | 392 | 2,380 | 2,380 | - | - | 5,893 | - | - | - | - | - | 239,327 | 12,340 | - |
| 4b.1.2.21 | Fuel Handling | - | 108 | 6 | 11 | 152 | 73 | - | 70 | 421 | 421 | - | - | 908 | 218 | - | - | - | - | 50,723 | 1,595 | - |
| 4b.1.2.22 | Fuel Oil | - | 121 | - | - | - | - | - | 18 | 140 | - | - | 140 | - | - | - | - | - | - | - | 1,697 | - |
| 4b.1.2.23 | HVAC - Clean | - | 120 | - | - | - | - | - | 18 | 138 | - | - | 138 | - | - | - | - | - | - | - | 1,891 | - |
| 4b.1.2.24 | HVAC - Contaminated | - | 337 | 9 | 26 | 546 | 41 | - | 181 | 1,141 | 1,141 | - | - | 3,261 | 123 | - | - | - | - | 140,257 | 4,335 | - |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table G-1
Prairie Island SAFSTOR Unit 1
SAFSTOR Decommissioning Cost Estimate with DOE Pickup of Industry Spent Fuel Starting in 2035
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|---------------------------------------|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|---------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| Disposal of Plant Systems (continued) | | | | | | | | | | | | | | | | | | | | | | |
| 4b.1.2.25 | HVAC - Contaminated - Fuel Pool | - | 145 | 4 | 11 | 234 | 18 | - | 78 | 489 | 489 | - | - | 1,398 | 53 | - | - | - | - | 60,110 | 1,858 | - |
| 4b.1.2.26 | Incore Instrumentation | - | 25 | 1 | 2 | 10 | 19 | - | 13 | 70 | 70 | - | - | 60 | 57 | - | - | - | - | 6,058 | 382 | - |
| 4b.1.2.27 | Misc Drains & Vents | - | 212 | 15 | 13 | 65 | 176 | - | 110 | 592 | 592 | - | - | 390 | 514 | - | - | - | - | 49,062 | 2,764 | - |
| 4b.1.2.28 | Reactor Coolant | - | 283 | 21 | 18 | 58 | 265 | - | 150 | 796 | 796 | - | - | 344 | 777 | - | - | - | - | 64,085 | 3,865 | - |
| 4b.1.2.29 | Reactor Hot Sampling | - | 125 | 12 | 7 | 11 | 118 | - | 65 | 339 | 339 | - | - | 66 | 342 | - | - | - | - | 25,063 | 1,611 | - |
| 4b.1.2.30 | Reactor Makeup | - | 73 | - | - | - | - | - | 11 | 84 | - | - | 84 | - | - | - | - | - | - | - | 1,042 | - |
| 4b.1.2.31 | Reactor Vessel | - | 19 | 1 | 0 | 4 | 5 | - | 7 | 36 | 36 | - | - | 26 | 14 | - | - | - | - | 2,000 | 260 | - |
| 4b.1.2.32 | Residual Heat Removal | - | 378 | 85 | 86 | 484 | 1,105 | - | 465 | 2,603 | 2,603 | - | - | 2,895 | 3,252 | - | - | - | - | 326,425 | 5,374 | - |
| 4b.1.2.33 | Safeguards Chilled Water | - | 18 | - | - | - | - | - | 3 | 20 | - | - | 20 | - | - | - | - | - | - | - | 259 | - |
| 4b.1.2.34 | Safeguards Chilled Water - RCA | - | 85 | 1 | 4 | 83 | - | - | 34 | 207 | 207 | - | - | 495 | - | - | - | - | - | 20,100 | 1,019 | - |
| 4b.1.2.35 | Safety Injection | - | 809 | 42 | 73 | 1,136 | 393 | - | 486 | 2,939 | 2,939 | - | - | 6,788 | 1,156 | - | - | - | - | 349,908 | 11,276 | - |
| 4b.1.2.36 | Sampling | - | 54 | 4 | 3 | 10 | 37 | - | 25 | 133 | 133 | - | - | 59 | 107 | - | - | - | - | 9,420 | 731 | - |
| 4b.1.2.37 | Shield Bldg Ventilation | - | 125 | 14 | 26 | 360 | 165 | - | 132 | 821 | 821 | - | - | 2,152 | 491 | - | - | - | - | 118,583 | 1,811 | - |
| 4b.1.2.38 | Spent Fuel Pool Cooling | - | 324 | 34 | 32 | 135 | 450 | - | 222 | 1,198 | 1,198 | - | - | 806 | 1,325 | - | - | - | - | 117,816 | 4,400 | - |
| 4b.1.2.39 | Station & Instrument Air | - | 20 | - | - | - | - | - | 3 | 23 | - | - | 23 | - | - | - | - | - | - | - | 300 | - |
| 4b.1.2.40 | Station & Instrument Air - RCA | - | 81 | 1 | 2 | 56 | - | - | 29 | 169 | 169 | - | - | 332 | - | - | - | - | - | 13,496 | 1,053 | - |
| 4b.1.2.41 | Station & Instrument Air - RCA Fuel Pool | - | 20 | 0 | 1 | 14 | - | - | 7 | 42 | 42 | - | - | 83 | - | - | - | - | - | 3,374 | 263 | - |
| 4b.1.2.42 | Turbine Bldg Traps & Drains | - | 50 | - | - | - | - | - | 8 | 58 | - | - | 58 | - | - | - | - | - | - | - | 767 | - |
| 4b.1.2.43 | Unit Coolers | - | 42 | - | - | - | - | - | 6 | 49 | - | - | 49 | - | - | - | - | - | - | - | 611 | - |
| 4b.1.2.44 | Unit Coolers - RCA | - | 55 | 0 | 2 | 39 | - | - | 20 | 115 | 115 | - | - | 230 | - | - | - | - | - | 9,348 | 683 | - |
| 4b.1.2 | Totals | - | 14,735 | 481 | 883 | 14,533 | 4,126 | - | 6,807 | 41,565 | 38,474 | - | - | 86,861 | 12,129 | - | - | - | - | 4,307,475 | 198,796 | - |
| 4b.1.3 | Scaffolding in support of decommissioning | - | 1,363 | 4 | 2 | 38 | 6 | - | 349 | 1,763 | 1,763 | - | - | 207 | 18 | - | - | - | - | 10,477 | 9,030 | - |
| Decontamination of Site Buildings | | | | | | | | | | | | | | | | | | | | | | |
| 4b.1.4.1 | Reactor | 1,096 | 2,527 | 240 | 1,236 | 373 | 7,080 | - | 3,215 | 15,766 | 15,766 | - | - | 2,230 | 67,325 | - | - | - | - | 3,286,372 | 45,729 | - |
| 4b.1.4.2 | Backwash Waste Receiving Tank | - | 25 | 3 | 17 | - | 97 | - | 33 | 175 | 175 | - | - | - | 929 | - | - | - | - | 43,896 | 266 | - |
| 4b.1.4 | Totals | 1,096 | 2,552 | 243 | 1,253 | 373 | 7,177 | - | 3,248 | 15,941 | 15,941 | - | - | 2,230 | 68,254 | - | - | - | - | 3,330,268 | 45,995 | - |
| 4b.1.5 | Prepare/submit License Termination Plan | - | - | - | - | - | - | 526 | 79 | 605 | 605 | - | - | - | - | - | - | - | - | - | - | 4,096 |
| 4b.1.6 | Receive NRC approval of termination plan | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - | - |
| 4b.1 | Subtotal Period 4b Activity Costs | 1,410 | 18,685 | 814 | 2,179 | 14,945 | 12,012 | 526 | 10,839 | 61,410 | 58,319 | - | - | 89,298 | 82,494 | - | - | - | - | 7,781,139 | 254,398 | 4,096 |
| Period 4b Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 4b.2.1 | License Termination Survey Planning | - | - | - | - | - | - | 1,037 | 311 | 1,348 | 1,348 | - | - | - | - | - | - | - | - | - | - | 6,240 |
| 4b.2.2 | Excavation of Underground Services | - | 1,175 | - | - | - | - | 225 | 328 | 1,728 | 1,728 | - | - | - | - | - | - | - | - | - | 7,411 | - |
| 4b.2.3 | Operational Equipment | - | - | 11 | 36 | 606 | - | - | 97 | 751 | 751 | - | - | 5,880 | - | - | - | - | - | 147,000 | 16 | - |
| 4b.2.4 | License Termination ISFSI | - | 24 | 81 | 435 | - | 2,532 | 1,375 | 1,112 | 5,560 | 5,560 | - | - | - | 9,355 | - | - | - | - | 1,123,457 | 3,762 | 5,460 |
| 4b.2 | Subtotal Period 4b Additional Costs | - | 1,199 | 93 | 471 | 606 | 2,532 | 2,638 | 1,848 | 9,387 | 9,387 | - | - | 5,880 | 9,355 | - | - | - | - | 1,270,457 | 11,189 | 11,700 |
| Period 4b Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 4b.3.1 | Process decommissioning water waste | 5 | - | 9 | 16 | - | 37 | - | 15 | 83 | 83 | - | - | - | 85 | - | - | - | - | 5,092 | 17 | - |
| 4b.3.3 | Small tool allowance | - | 307 | - | - | - | - | - | 46 | 353 | 353 | - | - | - | - | - | - | - | - | - | - | - |
| 4b.3.4 | Decommissioning Equipment Disposition | - | - | 130 | 67 | 1,112 | 178 | - | 234 | 1,722 | 1,722 | - | - | 6,000 | 529 | - | - | - | - | 303,608 | 147 | - |
| 4b.3.5 | On-site survey and release of 0.0 tons clean metallic waste | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 4b.3 | Subtotal Period 4b Collateral Costs | 5 | 307 | 139 | 84 | 1,112 | 215 | - | 296 | 2,158 | 2,158 | - | - | 6,000 | 614 | - | - | - | - | 308,700 | 163 | - |
| Period 4b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 4b.4.1 | Decon supplies | 564 | - | - | - | - | - | - | 141 | 705 | 705 | - | - | - | - | - | - | - | - | - | - | - |
| 4b.4.2 | Insurance | - | - | - | - | - | 862 | - | 86 | 949 | 949 | - | - | - | - | - | - | - | - | - | - | - |
| 4b.4.3 | Property taxes | - | - | - | - | - | - | 3,505 | 351 | 3,856 | 3,856 | - | - | - | - | - | - | - | - | - | - | - |
| 4b.4.4 | Health physics supplies | - | 2,456 | - | - | - | - | - | 614 | 3,070 | 3,070 | - | - | - | - | - | - | - | - | - | - | - |
| 4b.4.5 | Heavy equipment rental | - | 4,577 | - | - | - | - | - | 687 | 5,263 | 5,263 | - | - | - | - | - | - | - | - | - | - | - |
| 4b.4.6 | Disposal of DAW generated | - | - | 77 | 31 | - | 322 | - | 93 | 523 | 523 | - | - | - | 3,905 | - | - | - | - | 78,097 | 127 | - |
| 4b.4.7 | Plant energy budget | - | - | - | - | - | - | 2,165 | 325 | 2,490 | 2,490 | - | - | - | - | - | - | - | - | - | - | - |
| 4b.4.8 | NRC Fees | - | - | - | - | - | 862 | - | 86 | 948 | 948 | - | - | - | - | - | - | - | - | - | - | - |
| 4b.4.9 | Fixed Overhead | - | - | - | - | - | 2,118 | - | 318 | 2,436 | 2,436 | - | - | - | - | - | - | - | - | - | - | - |
| 4b.4.10 | Liquid Radwaste Processing Equipment/Services | - | - | - | - | - | 757 | - | 113 | 870 | 870 | - | - | - | - | - | - | - | - | - | - | - |
| 4b.4.11 | Railroad Track Maintenance | - | - | - | - | - | 111 | - | 17 | 128 | 128 | - | - | - | - | - | - | - | - | - | - | - |
| 4b.4.12 | Remedial Actions Surveys | - | - | - | - | - | 1,995 | - | 299 | 2,294 | 2,294 | - | - | - | - | - | - | - | - | - | - | - |
| 4b.4.13 | Security Staff Cost | - | - | - | - | - | 1,202 | - | 180 | 1,383 | 1,383 | - | - | - | - | - | - | - | - | - | - | 20,373 |
| 4b.4.14 | DOC Staff Cost | - | - | - | - | - | 15,039 | - | 2,256 | 17,294 | 17,294 | - | - | - | - | - | - | - | - | - | - | 174,093 |
| 4b.4.15 | Utility Staff Cost | - | - | - | - | - | 18,793 | - | 2,819 | 21,612 | 21,612 | - | - | - | - | - | - | - | - | - | - | 311,145 |
| 4b.4 | Subtotal Period 4b Period-Dependent Costs | 564 | 7,033 | 77 | 31 | - | 322 | 47,410 | 8,384 | 63,822 | 63,822 | - | - | - | 3,905 | - | - | - | - | 78,097 | 127 | 505,611 |
| 4b.0 | TOTAL PERIOD 4b COST | 1,979 | 27,224 | 1,123 | 2,765 | 16,663 | 15,081 | 50,574 | 21,367 | 136,776 | 133,686 | - | - | 101,178 | 96,368 | - | - | - | - | 9,438,392 | 265,878 | 521,407 |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table G-1
Prairie Island SAFSTOR Unit 1
SAFSTOR Decommissioning Cost Estimate with DOE Pickup of Industry Spent Fuel Starting in 2035
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|---|---|--------------|---------------|-----------------|-----------------|---------------------------|---------------------|----------------|-------------------|----------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|---------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| PERIOD 4e - Delay before License Termination | | | | | | | | | | | | | | | | | | | | | | |
| Period 4e Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Period 4e Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 4e.4.2 | Property taxes | - | - | - | - | - | - | 1,476 | 148 | 1,623 | 1,623 | - | - | - | - | - | - | - | - | - | - | - |
| 4e.4.3 | Health physics supplies | - | 87 | - | - | - | - | - | 22 | 109 | 109 | - | - | - | - | - | - | - | - | - | - | - |
| 4e.4.4 | Disposal of DAW generated | - | - | 2 | 1 | - | 6 | - | 2 | 11 | 11 | - | - | - | 79 | - | - | - | - | 1,573 | 3 | - |
| 4e.4.6 | NRC Fees | - | - | - | - | - | - | 162 | 16 | 178 | 178 | - | - | - | - | - | - | - | - | - | - | - |
| 4e.4.7 | Fixed Overhead | - | - | - | - | - | - | 939 | 141 | 1,079 | 1,079 | - | - | - | - | - | - | - | - | - | - | - |
| 4e.4.8 | Railroad Track Maintenance | - | - | - | - | - | - | 49 | 7 | 57 | 57 | - | - | - | - | - | - | - | - | - | - | - |
| 4e.4.9 | Utility Staff Cost | - | - | - | - | - | - | 696 | 104 | 801 | 801 | - | - | - | - | - | - | - | - | - | - | 11,488 |
| 4e.4 | Subtotal Period 4e Period-Dependent Costs | - | 87 | 2 | 1 | - | 6 | 3,322 | 440 | 3,858 | 3,858 | - | - | - | 79 | - | - | - | - | 1,573 | 3 | 11,488 |
| 4e.0 | TOTAL PERIOD 4e COST | - | 87 | 2 | 1 | - | 6 | 3,322 | 440 | 3,858 | 3,858 | - | - | - | 79 | - | - | - | - | 1,573 | 3 | 11,488 |
| PERIOD 4f - License Termination | | | | | | | | | | | | | | | | | | | | | | |
| Period 4f Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| 4f.1.1 | ORISE confirmatory survey | - | - | - | - | - | - | 166 | 50 | 216 | 216 | - | - | - | - | - | - | - | - | - | - | - |
| 4f.1.2 | Terminate license | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 4f.1 | Subtotal Period 4f Activity Costs | - | - | - | - | - | - | 166 | 50 | 216 | 216 | - | - | - | - | - | - | - | - | - | - | - |
| Period 4f Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 4f.2.1 | License Termination Survey | - | - | - | - | - | - | 3,199 | 960 | 4,159 | 4,159 | - | - | - | - | - | - | - | - | - | 40,531 | 3,120 |
| 4f.2 | Subtotal Period 4f Additional Costs | - | - | - | - | - | - | 3,199 | 960 | 4,159 | 4,159 | - | - | - | - | - | - | - | - | - | 40,531 | 3,120 |
| Period 4f Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 4f.3.1 | DOC staff relocation expenses | - | - | - | - | - | - | 1,264 | 190 | 1,454 | 1,454 | - | - | - | - | - | - | - | - | - | - | - |
| 4f.3 | Subtotal Period 4f Collateral Costs | - | - | - | - | - | - | 1,264 | 190 | 1,454 | 1,454 | - | - | - | - | - | - | - | - | - | - | - |
| Period 4f Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 4f.4.2 | Property taxes | - | - | - | - | - | - | 1,335 | 133 | 1,468 | 1,468 | - | - | - | - | - | - | - | - | - | - | - |
| 4f.4.3 | Health physics supplies | - | 499 | - | - | - | - | - | 125 | 624 | 624 | - | - | - | - | - | - | - | - | - | - | - |
| 4f.4.4 | Disposal of DAW generated | - | - | 7 | 3 | - | 27 | - | 8 | 45 | 45 | - | - | - | 332 | - | - | - | - | 6,649 | 11 | - |
| 4f.4.5 | Plant energy budget | - | - | - | - | - | - | 243 | 36 | 279 | 279 | - | - | - | - | - | - | - | - | - | - | - |
| 4f.4.6 | NRC Fees | - | - | - | - | - | - | 422 | 42 | 465 | 465 | - | - | - | - | - | - | - | - | - | - | - |
| 4f.4.7 | Fixed Overhead | - | - | - | - | - | - | 890 | 133 | 1,023 | 1,023 | - | - | - | - | - | - | - | - | - | - | - |
| 4f.4.8 | Railroad Track Maintenance | - | - | - | - | - | - | 47 | 7 | 54 | 54 | - | - | - | - | - | - | - | - | - | - | - |
| 4f.4.9 | Security Staff Cost | - | - | - | - | - | - | 805 | 121 | 926 | 926 | - | - | - | - | - | - | - | - | - | - | 11,668 |
| 4f.4.10 | DOC Staff Cost | - | - | - | - | - | - | 4,238 | 636 | 4,874 | 4,874 | - | - | - | - | - | - | - | - | - | - | 46,283 |
| 4f.4.11 | Utility Staff Cost | - | - | - | - | - | - | 3,772 | 566 | 4,338 | 4,338 | - | - | - | - | - | - | - | - | - | - | 56,395 |
| 4f.4 | Subtotal Period 4f Period-Dependent Costs | - | 499 | 7 | 3 | - | 27 | 11,752 | 1,808 | 14,096 | 14,096 | - | - | - | 332 | - | - | - | - | 6,649 | 11 | 114,346 |
| 4f.0 | TOTAL PERIOD 4f COST | - | 499 | 7 | 3 | - | 27 | 16,381 | 3,007 | 19,924 | 19,924 | - | - | - | 332 | - | - | - | - | 6,649 | 40,542 | 117,466 |
| PERIOD 4 TOTALS | | 2,227 | 55,364 | 16,927 | 6,284 | 22,974 | 43,490 | 124,588 | 59,158 | 331,012 | 325,439 | - | 5,573 | 141,584 | 129,564 | 125 | 742 | 1,773 | 13,792,410 | 472,147 | 1,263,075 | |
| PERIOD 5b - Site Restoration | | | | | | | | | | | | | | | | | | | | | | |
| Period 5b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Demolition of Remaining Site Buildings | | | | | | | | | | | | | | | | | | | | | | |
| 5b.1.1.1 | Reactor | - | 4,644 | - | - | - | - | - | 697 | 5,341 | - | - | 5,341 | - | - | - | - | - | - | - | 44,669 | - |
| 5b.1.1.2 | Condensate Storage Tank Foundation | - | 3 | - | - | - | - | - | 0 | 4 | - | - | 4 | - | - | - | - | - | - | - | 16 | - |
| 5b.1.1.3 | Structures below 3' below grade | - | 1,785 | - | - | - | - | - | 268 | 2,052 | - | - | 2,052 | - | - | - | - | - | - | - | 9,238 | - |
| 5b.1.1.4 | Turbine | - | 2,139 | - | - | - | - | - | 321 | 2,460 | - | - | 2,460 | - | - | - | - | - | - | - | 21,985 | - |
| 5b.1.1.5 | Turbine Pedestal | - | 365 | - | - | - | - | - | 55 | 420 | - | - | 420 | - | - | - | - | - | - | - | 1,857 | - |
| 5b.1.1 | Totals | - | 8,936 | - | - | - | - | - | 1,340 | 10,276 | - | - | 10,276 | - | - | - | - | - | - | - | 77,765 | - |
| Site Closeout Activities | | | | | | | | | | | | | | | | | | | | | | |
| 5b.1.2 | Grade & landscape site | - | 448 | - | - | - | - | - | 67 | 515 | - | - | 515 | - | - | - | - | - | - | - | 921 | - |
| 5b.1.3 | Final report to NRC | - | - | - | - | - | - | 200 | 30 | 231 | 231 | - | - | - | - | - | - | - | - | - | - | 1,560 |
| 5b.1 | Subtotal Period 5b Activity Costs | - | 9,384 | - | - | - | - | 200 | 1,438 | 11,022 | 231 | - | 10,792 | - | - | - | - | - | - | - | 78,686 | 1,560 |
| Period 5b Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 5b.2.1 | Clean Concrete Disposal | - | 2,242 | - | - | - | - | 5 | 337 | 2,583 | - | - | 2,583 | - | - | - | - | - | - | - | 8,386 | - |
| 5b.2.2 | Intake Structure Cofferdam | - | 623 | - | - | - | - | - | 93 | 716 | - | - | 716 | - | - | - | - | - | - | - | 5,168 | - |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table G-1
Prairie Island SAFSTOR Unit 1
SAFSTOR Decommissioning Cost Estimate with DOE Pickup of Industry Spent Fuel Starting in 2035
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|--|---|--|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|---------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| Period 5b Additional Costs (continued) | | | | | | | | | | | | | | | | | | | | | | |
| 5b.2.3 | Construction Debris | - | - | - | - | - | - | 10 | 2 | 12 | - | - | 12 | - | - | - | - | - | - | - | - | - |
| 5b.2.4 | Backfill | - | 3,011 | - | - | - | - | - | 452 | 3,462 | - | - | 3,462 | - | - | - | - | - | - | - | 2,904 | - |
| 5b.2.5 | Demolition and Site Restoration of ISFSI | - | 515 | - | - | - | - | 68 | 87 | 670 | - | - | 670 | - | - | - | - | - | - | - | 2,219 | 80 |
| 5b.2 | Subtotal Period 5b Additional Costs | - | 6,390 | - | - | - | - | 82 | 971 | 7,443 | - | - | 7,443 | - | - | - | - | - | - | - | 18,677 | 80 |
| Period 5b Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 5b.3.1 | Small tool allowance | - | 125 | - | - | - | - | - | 19 | 143 | - | - | 143 | - | - | - | - | - | - | - | - | - |
| 5b.3 | Subtotal Period 5b Collateral Costs | - | 125 | - | - | - | - | - | 19 | 143 | - | - | 143 | - | - | - | - | - | - | - | - | - |
| Period 5b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 5b.4.2 | Property taxes | - | - | - | - | - | - | 3,481 | 348 | 3,829 | - | - | 3,829 | - | - | - | - | - | - | - | - | - |
| 5b.4.3 | Heavy equipment rental | - | 7,144 | - | - | - | - | - | 1,072 | 8,215 | - | - | 8,215 | - | - | - | - | - | - | - | - | - |
| 5b.4.4 | Plant energy budget | - | - | - | - | - | - | 344 | 52 | 395 | - | - | 395 | - | - | - | - | - | - | - | - | - |
| 5b.4.5 | Fixed Overhead | - | - | - | - | - | - | 1,024 | 154 | 1,178 | - | - | 1,178 | - | - | - | - | - | - | - | - | - |
| 5b.4.6 | Railroad Track Maintenance | - | - | - | - | - | - | 133 | 20 | 152 | - | - | 152 | - | - | - | - | - | - | - | - | - |
| 5b.4.7 | Security Staff Cost | - | - | - | - | - | - | 2,055 | 308 | 2,363 | - | - | 2,363 | - | - | - | - | - | - | - | - | 29,221 |
| 5b.4.8 | DOC Staff Cost | - | - | - | - | - | - | 10,921 | 1,638 | 12,559 | - | - | 12,559 | - | - | - | - | - | - | - | - | 116,885 |
| 5b.4.9 | Utility Staff Cost | - | - | - | - | - | - | 3,831 | 575 | 4,406 | - | - | 4,406 | - | - | - | - | - | - | - | - | 57,340 |
| 5b.4 | Subtotal Period 5b Period-Dependent Costs | - | 7,144 | - | - | - | - | 21,789 | 4,166 | 33,099 | - | - | 33,099 | - | - | - | - | - | - | - | - | 203,445 |
| 5b.0 | TOTAL PERIOD 5b COST | - | 23,042 | - | - | - | - | 22,072 | 6,593 | 51,707 | 231 | - | 51,476 | - | - | - | - | - | - | - | 97,363 | 205,085 |
| PERIOD 5 TOTALS | | - | 23,042 | - | - | - | - | 22,072 | 6,593 | 51,707 | 231 | - | 51,476 | - | - | - | - | - | - | - | 97,363 | 205,085 |
| TOTAL COST TO DECOMMISSION | | 6,192 | 93,417 | 17,547 | 6,792 | 23,152 | 45,943 | 944,911 | 172,676 | 1,310,629 | 970,442 | 281,510 | 58,677 | 147,716 | 151,067 | 125 | 742 | 1,773 | 14,526,470 | 647,741 | 6,194,735 | |
| TOTAL COST TO DECOMMISSION WITH 15.17% CONTINGENCY: | | \$1,310,629 thousands of 2020 dollars | | | | | | | | | | | | | | | | | | | | |
| TOTAL NRC LICENSE TERMINATION COST IS 74.04% OR: | | \$970,442 thousands of 2020 dollars | | | | | | | | | | | | | | | | | | | | |
| SPENT FUEL MANAGEMENT COST IS 21.48% OR: | | \$281,510 thousands of 2020 dollars | | | | | | | | | | | | | | | | | | | | |
| NON-NUCLEAR DEMOLITION COST IS 4.48% OR: | | \$58,677 thousands of 2020 dollars | | | | | | | | | | | | | | | | | | | | |
| TOTAL LOW-LEVEL RADIOACTIVE WASTE VOLUME BURIED (EXCLUDING GTCC): | | 151,935 Cubic Feet | | | | | | | | | | | | | | | | | | | | |
| TOTAL GREATER THAN CLASS C RADWASTE VOLUME GENERATED: | | 1,773 Cubic Feet | | | | | | | | | | | | | | | | | | | | |
| TOTAL SCRAP METAL REMOVED: | | 33,003 Tons | | | | | | | | | | | | | | | | | | | | |
| TOTAL CRAFT LABOR REQUIREMENTS: | | 647,741 Man-hours | | | | | | | | | | | | | | | | | | | | |

End Notes:
n/a - indicates that this activity not charged as decommissioning expense
a - indicates that this activity performed by decommissioning staff
0 - indicates that this value is less than 0.5 but is non-zero
A cell containing " - " indicates a zero value

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table G-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with DOE Pickup of Industry Spent Fuel Starting in 2035
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|--|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| PERIOD 1a - Shutdown through Transition | | | | | | | | | | | | | | | | | | | | | |
| Period 1a Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| 1a.1.1 | SAFSTOR site characterization survey | - | - | - | - | - | - | 415 | 124 | 539 | 539 | - | - | - | - | - | - | - | - | - | - |
| 1a.1.2 | Prepare preliminary decommissioning cost | - | - | - | - | - | - | 71 | 11 | 82 | 82 | - | - | - | - | - | - | - | - | - | 556 |
| 1a.1.3 | Notification of Cessation of Operations | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.4 | Remove fuel & source material | - | - | - | - | - | - | - | - | n/a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.5 | Notification of Permanent Defueling | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.6 | Deactivate plant systems & process waste | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.7 | Prepare and submit PSDAR | - | - | - | - | - | - | 110 | 16 | 126 | 126 | - | - | - | - | - | - | - | - | - | 855 |
| 1a.1.8 | Review plant dwgs & specs. | - | - | - | - | - | - | 71 | 11 | 82 | 82 | - | - | - | - | - | - | - | - | - | 556 |
| 1a.1.9 | Perform detailed rad survey | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.10 | Estimate by-product inventory | - | - | - | - | - | - | 55 | 8 | 63 | 63 | - | - | - | - | - | - | - | - | - | 428 |
| 1a.1.11 | End product description | - | - | - | - | - | - | 55 | 8 | 63 | 63 | - | - | - | - | - | - | - | - | - | 428 |
| 1a.1.12 | Detailed by-product inventory | - | - | - | - | - | - | 82 | 12 | 95 | 95 | - | - | - | - | - | - | - | - | - | 641 |
| 1a.1.13 | Define major work sequence | - | - | - | - | - | - | 55 | 8 | 63 | 63 | - | - | - | - | - | - | - | - | - | 428 |
| 1a.1.14 | Perform SER and EA | - | - | - | - | - | - | 170 | 26 | 196 | 196 | - | - | - | - | - | - | - | - | - | 1,326 |
| 1a.1.15 | Perform Site-Specific Cost Study | - | - | - | - | - | - | 275 | 41 | 316 | 316 | - | - | - | - | - | - | - | - | - | 2,138 |
| Activity Specifications | | | | | | | | | | | | | | | | | | | | | |
| 1a.1.16.1 | Prepare plant and facilities for SAFSTOR | - | - | - | - | - | - | 270 | 41 | 311 | 311 | - | - | - | - | - | - | - | - | - | 2,104 |
| 1a.1.16.2 | Plant systems | - | - | - | - | - | - | 229 | 34 | 263 | 263 | - | - | - | - | - | - | - | - | - | 1,782 |
| 1a.1.16.3 | Plant structures and buildings | - | - | - | - | - | - | 171 | 26 | 197 | 197 | - | - | - | - | - | - | - | - | - | 1,334 |
| 1a.1.16.4 | Waste management | - | - | - | - | - | - | 110 | 16 | 126 | 126 | - | - | - | - | - | - | - | - | - | 855 |
| 1a.1.16.5 | Facility and site dormancy | - | - | - | - | - | - | 110 | 16 | 126 | 126 | - | - | - | - | - | - | - | - | - | 855 |
| 1a.1.16 | Total | - | - | - | - | - | - | 891 | 134 | 1,024 | 1,024 | - | - | - | - | - | - | - | - | - | 6,930 |
| Detailed Work Procedures | | | | | | | | | | | | | | | | | | | | | |
| 1a.1.17.1 | Plant systems | - | - | - | - | - | - | 65 | 10 | 75 | 75 | - | - | - | - | - | - | - | - | - | 506 |
| 1a.1.17.2 | Facility closeout & dormancy | - | - | - | - | - | - | 66 | 10 | 76 | 76 | - | - | - | - | - | - | - | - | - | 513 |
| 1a.1.17 | Total | - | - | - | - | - | - | 131 | 20 | 151 | 151 | - | - | - | - | - | - | - | - | - | 1,019 |
| 1a.1.18 | Procure vacuum drying system | - | - | - | - | - | - | 5 | 1 | 6 | 6 | - | - | - | - | - | - | - | - | - | 43 |
| 1a.1.19 | Drain/de-energize non-cont. systems | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.20 | Drain & dry NSSS | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.21 | Drain/de-energize contaminated systems | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.22 | Decon/secure contaminated systems | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1 | Subtotal Period 1a Activity Costs | - | - | - | - | - | - | 2,387 | 420 | 2,807 | 2,807 | - | - | - | - | - | - | - | - | - | 15,347 |
| Period 1a Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 1a.3.1 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 1,330 | 199 | 1,529 | - | 1,529 | - | - | - | - | - | - | - | - | - |
| 1a.3.2 | Retention and Severance | - | - | - | - | - | - | 8,394 | 1,259 | 9,653 | 9,653 | - | - | - | - | - | - | - | - | - | - |
| 1a.3.3 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 1,249 | - | 1,249 | - | 1,249 | - | - | - | - | - | - | - | - | - |
| 1a.3 | Subtotal Period 1a Collateral Costs | - | - | - | - | - | - | 10,973 | 1,459 | 12,432 | 9,653 | 2,779 | - | - | - | - | - | - | - | - | - |
| Period 1a Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 1a.4.1 | Insurance | - | - | - | - | - | - | 1,660 | 166 | 1,826 | 1,826 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.2 | Property taxes | - | - | - | - | - | - | 3,623 | 362 | 3,985 | 3,985 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.3 | Health physics supplies | - | 604 | - | - | - | - | - | 151 | 755 | 755 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.4 | Heavy equipment rental | - | 753 | - | - | - | - | - | 113 | 866 | 866 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.5 | Disposal of DAW generated | - | - | 12 | 5 | - | 49 | - | 14 | 80 | 80 | - | - | 597 | - | - | - | - | 11,944 | 19 | - |
| 1a.4.6 | Plant energy budget | - | - | - | - | - | - | 1,621 | 243 | 1,864 | 1,864 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.7 | NRC Fees | - | - | - | - | - | - | 516 | 52 | 567 | 567 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.8 | Emergency Planning Fees | - | - | - | - | - | - | 2,174 | 217 | 2,392 | - | 2,392 | - | - | - | - | - | - | - | - | - |
| 1a.4.9 | Fixed Overhead | - | - | - | - | - | - | 1,440 | 216 | 1,656 | 1,656 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.10 | Spent Fuel Pool O&M | - | - | - | - | - | - | 422 | 63 | 486 | - | 486 | - | - | - | - | - | - | - | - | - |
| 1a.4.11 | ISFSI Operating Costs | - | - | - | - | - | - | 56 | 8 | 64 | - | 64 | - | - | - | - | - | - | - | - | - |
| 1a.4.12 | Railroad Track Maintenance | - | - | - | - | - | - | 63 | 9 | 72 | 72 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.13 | Security Staff Cost | - | - | - | - | - | - | 8,328 | 1,249 | 9,577 | 9,577 | - | - | - | - | - | - | - | - | - | 122,720 |
| 1a.4.14 | Utility Staff Cost | - | - | - | - | - | - | 25,478 | 3,822 | 29,300 | 29,300 | - | - | - | - | - | - | - | - | - | 400,944 |
| 1a.4 | Subtotal Period 1a Period-Dependent Costs | - | 1,357 | 12 | 5 | - | 49 | 45,381 | 6,687 | 53,491 | 50,549 | 2,942 | - | - | 597 | - | - | - | 11,944 | 19 | 523,664 |
| 1a.0 | TOTAL PERIOD 1a COST | - | 1,357 | 12 | 5 | - | 49 | 58,742 | 8,566 | 68,730 | 63,010 | 5,720 | - | - | 597 | - | - | - | 11,944 | 19 | 539,011 |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table G-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with DOE Pickup of Industry Spent Fuel Starting in 2035
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|--|--|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|---------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| PERIOD 1b - SAFSTOR Limited DECON Activities | | | | | | | | | | | | | | | | | | | | | | |
| Period 1b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Decontamination of Site Buildings | | | | | | | | | | | | | | | | | | | | | | |
| 1b.1.1.1 | Reactor | 1,199 | - | - | - | - | - | - | 599 | 1,798 | 1,798 | - | - | - | - | - | - | - | - | - | 17,003 | - |
| 1b.1.1.2 | Auxiliary | 1,244 | - | - | - | - | - | - | 622 | 1,866 | 1,866 | - | - | - | - | - | - | - | - | - | 17,950 | - |
| 1b.1.1.3 | Drum Transfer & Truck Loading Enclosure | 17 | - | - | - | - | - | - | 8 | 25 | 25 | - | - | - | - | - | - | - | - | - | 244 | - |
| 1b.1.1.4 | LLRW Storage Enclosure | 116 | - | - | - | - | - | - | 58 | 175 | 175 | - | - | - | - | - | - | - | - | - | 1,673 | - |
| 1b.1.1.5 | Radwaste | 52 | - | - | - | - | - | - | 26 | 78 | 78 | - | - | - | - | - | - | - | - | - | 749 | - |
| 1b.1.1.6 | Resin Disposal | 15 | - | - | - | - | - | - | 8 | 23 | 23 | - | - | - | - | - | - | - | - | - | 221 | - |
| 1b.1.1.7 | Fuel Handling of Aux Building | 1,014 | - | - | - | - | - | - | 507 | 1,521 | 1,521 | - | - | - | - | - | - | - | - | - | 13,854 | - |
| 1b.1.1 | Totals | 3,658 | - | - | - | - | - | - | 1,829 | 5,486 | 5,486 | - | - | - | - | - | - | - | - | - | 51,694 | - |
| 1b.1 | Subtotal Period 1b Activity Costs | 3,658 | - | - | - | - | - | - | 1,829 | 5,486 | 5,486 | - | - | - | - | - | - | - | - | - | 51,694 | - |
| Period 1b Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 1b.2.1 | Spent Fuel Pool Isolation | - | - | - | - | - | - | 8,450 | 1,268 | 9,718 | 9,718 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.2 | Subtotal Period 1b Additional Costs | - | - | - | - | - | - | 8,450 | 1,268 | 9,718 | 9,718 | - | - | - | - | - | - | - | - | - | - | - |
| Period 1b Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 1b.3.1 | Decon equipment | 1,055 | - | - | - | - | - | - | 158 | 1,213 | 1,213 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.3.2 | Process decommissioning water waste | 107 | - | 71 | 128 | - | 288 | - | 152 | 747 | 747 | - | - | - | 661 | - | - | - | - | - | 39,679 | 129 |
| 1b.3.4 | Small tool allowance | - | 61 | - | - | - | - | - | 9 | 70 | 70 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.3.5 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 309 | 46 | 356 | - | 356 | - | - | - | - | - | - | - | - | - | - |
| 1b.3.6 | Retention and Severance | - | - | - | - | - | - | 2,296 | 344 | 2,640 | 2,640 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.3.7 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 311 | - | 311 | - | 311 | - | - | - | - | - | - | - | - | - | - |
| 1b.3 | Subtotal Period 1b Collateral Costs | 1,162 | 61 | 71 | 128 | - | 288 | 2,917 | 710 | 5,337 | 4,670 | 667 | - | - | 661 | - | - | - | - | - | 39,679 | 129 |
| Period 1b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 1b.4.1 | Decon supplies | 1,334 | - | - | - | - | - | - | 333 | 1,667 | 1,667 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.2 | Insurance | - | - | - | - | - | - | 414 | 41 | 455 | 455 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.3 | Property taxes | - | - | - | - | - | - | 902 | 90 | 993 | 993 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.4 | Health physics supplies | - | 448 | - | - | - | - | - | 112 | 560 | 560 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.5 | Heavy equipment rental | - | 188 | - | - | - | - | - | 28 | 216 | 216 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.6 | Disposal of DAW generated | - | - | 13 | 5 | - | 53 | - | 15 | 86 | 86 | - | - | - | 641 | - | - | - | - | - | 12,830 | 21 |
| 1b.4.7 | Plant energy budget | - | - | - | - | - | - | 404 | 61 | 465 | 465 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.8 | NRC Fees | - | - | - | - | - | - | 98 | 10 | 108 | 108 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.9 | Emergency Planning Fees | - | - | - | - | - | - | 542 | 54 | 596 | - | 596 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.10 | Fixed Overhead | - | - | - | - | - | - | 359 | 54 | 413 | 413 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.11 | Spent Fuel Pool O&M | - | - | - | - | - | - | 105 | 16 | 121 | - | 121 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.12 | ISFSI Operating Costs | - | - | - | - | - | - | 14 | 2 | 16 | - | 16 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.13 | Railroad Track Maintenance | - | - | - | - | - | - | 16 | 2 | 18 | 18 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.14 | Security Staff Cost | - | - | - | - | - | - | 2,076 | 311 | 2,388 | 2,388 | - | - | - | - | - | - | - | - | - | - | 30,596 |
| 1b.4.15 | Utility Staff Cost | - | - | - | - | - | - | 6,714 | 1,007 | 7,722 | 7,722 | - | - | - | - | - | - | - | - | - | - | 105,271 |
| 1b.4 | Subtotal Period 1b Period-Dependent Costs | 1,334 | 635 | 13 | 5 | - | 53 | 11,645 | 2,138 | 15,823 | 15,089 | 733 | - | - | 641 | - | - | - | - | - | 12,830 | 21 |
| 1b.0 | TOTAL PERIOD 1b COST | 6,153 | 696 | 84 | 133 | - | 341 | 23,012 | 5,944 | 36,364 | 34,963 | 1,401 | - | - | 1,303 | - | - | - | - | - | 52,509 | 51,844 |
| PERIOD 1c - Preparations for SAFSTOR Dormancy | | | | | | | | | | | | | | | | | | | | | | |
| Period 1c Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| 1c.1.1 | Prepare support equipment for storage | - | 527 | - | - | - | - | - | 79 | 606 | 606 | - | - | - | - | - | - | - | - | - | 3,000 | - |
| 1c.1.2 | Install containment pressure equal. lines | - | 54 | - | - | - | - | - | 8 | 62 | 62 | - | - | - | - | - | - | - | - | - | 700 | - |
| 1c.1.3 | Interim survey prior to dormancy | - | - | - | - | - | - | 733 | 220 | 953 | 953 | - | - | - | - | - | - | - | - | - | 12,801 | - |
| 1c.1.4 | Secure building accesses | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - | - |
| 1c.1.5 | Prepare & submit interim report | - | - | - | - | - | - | 32 | 5 | 37 | 37 | - | - | - | - | - | - | - | - | - | - | 249 |
| 1c.1 | Subtotal Period 1c Activity Costs | - | 581 | - | - | - | - | 765 | 312 | 1,658 | 1,658 | - | - | - | - | - | - | - | - | - | 16,501 | 249 |
| Period 1c Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 1c.3.1 | Process decommissioning water waste | 91 | - | 60 | 109 | - | 245 | - | 129 | 634 | 634 | - | - | - | 561 | - | - | - | - | - | 33,685 | 109 |
| 1c.3.2 | Process decommissioning chemical flush waste | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 1c.3.3 | Small tool allowance | - | 5 | - | - | - | - | - | 1 | 6 | 6 | - | - | - | - | - | - | - | - | - | - | - |
| 1c.3.4 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 90 | 13 | 103 | - | 103 | - | - | - | - | - | - | - | - | - | - |
| 1c.3.5 | Retention and Severance | - | - | - | - | - | - | 1,722 | 258 | 1,980 | 1,980 | - | - | - | - | - | - | - | - | - | - | - |
| 1c.3.6 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 311 | - | 311 | - | 311 | - | - | - | - | - | - | - | - | - | - |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table G-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with DOE Pickup of Industry Spent Fuel Starting in 2035
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|---|---|--------------|--------------|-----------------|-----------------|---------------------------|---------------------|---------------|-------------------|----------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|---------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| Period 1c Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 1c.3 | Subtotal Period 1c Collateral Costs | 91 | 5 | 60 | 109 | - | 245 | 2,123 | 401 | 3,034 | 2,619 | 415 | - | - | - | 561 | - | - | - | 33,685 | 109 | - |
| 1c.4.1 | Insurance | - | - | - | - | - | - | 414 | 41 | 455 | 455 | - | - | - | - | - | - | - | - | - | - | - |
| 1c.4.2 | Property taxes | - | - | - | - | - | - | 901 | 90 | 991 | 991 | - | - | - | - | - | - | - | - | - | - | - |
| 1c.4.3 | Health physics supplies | - | 248 | - | - | - | - | - | 62 | 309 | 309 | - | - | - | - | - | - | - | - | - | - | - |
| 1c.4.4 | Heavy equipment rental | - | 188 | - | - | - | - | - | 28 | 216 | 216 | - | - | - | - | - | - | - | - | - | - | - |
| 1c.4.5 | Disposal of DAW generated | - | - | 3 | 1 | - | 13 | - | 4 | 20 | 20 | - | - | - | 152 | - | - | - | 3,039 | 5 | - | |
| 1c.4.6 | Plant energy budget | - | - | - | - | - | - | 404 | 61 | 465 | 465 | - | - | - | - | - | - | - | - | - | - | - |
| 1c.4.7 | NRC Fees | - | - | - | - | - | - | 98 | 10 | 108 | 108 | - | - | - | - | - | - | - | - | - | - | - |
| 1c.4.8 | Emergency Planning Fees | - | - | - | - | - | - | 542 | 54 | 596 | - | 596 | - | - | - | - | - | - | - | - | - | - |
| 1c.4.9 | Fixed Overhead | - | - | - | - | - | - | 359 | 54 | 413 | 413 | - | - | - | - | - | - | - | - | - | - | - |
| 1c.4.10 | Spent Fuel Pool O&M | - | - | - | - | - | - | 105 | 16 | 121 | - | 121 | - | - | - | - | - | - | - | - | - | - |
| 1c.4.11 | ISFSI Operating Costs | - | - | - | - | - | - | 14 | 2 | 16 | - | 16 | - | - | - | - | - | - | - | - | - | - |
| 1c.4.12 | Railroad Track Maintenance | - | - | - | - | - | - | 16 | 2 | 18 | 18 | - | - | - | - | - | - | - | - | - | - | - |
| 1c.4.13 | Security Staff Cost | - | - | - | - | - | - | 2,076 | 311 | 2,388 | 2,388 | - | - | - | - | - | - | - | - | - | - | 30,596 |
| 1c.4.14 | Utility Staff Cost | - | - | - | - | - | - | 6,714 | 1,007 | 7,722 | 7,722 | - | - | - | - | - | - | - | - | - | - | 105,271 |
| 1c.4 | Subtotal Period 1c Period-Dependent Costs | - | 435 | 3 | 1 | - | 13 | 11,643 | 1,742 | 13,838 | 13,104 | 733 | - | - | 152 | - | - | - | 3,039 | 5 | 135,867 | |
| 1c.0 | TOTAL PERIOD 1c COST | 91 | 1,021 | 63 | 110 | - | 257 | 14,531 | 2,456 | 18,530 | 17,382 | 1,148 | - | - | 713 | - | - | - | 36,724 | 16,615 | 136,116 | |
| PERIOD 1 TOTALS | | 6,244 | 3,074 | 159 | 248 | - | 647 | 96,285 | 16,965 | 123,623 | 115,354 | 8,269 | - | - | 2,613 | - | - | - | 101,177 | 68,478 | 810,994 | |
| PERIOD 2a - SAFSTOR Dormancy with Wet Spent Fuel Storage | | | | | | | | | | | | | | | | | | | | | | |
| Period 2a Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| 2a.1.1 | Quarterly Inspection | - | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 2a.1.2 | Semi-annual environmental survey | - | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 2a.1.3 | Prepare reports | - | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 2a.1.4 | Bituminous roof replacement | - | - | - | - | - | - | 223 | 33 | 256 | 256 | - | - | - | - | - | - | - | - | - | - | - |
| 2a.1.5 | Maintenance supplies | - | - | - | - | - | - | 349 | 87 | 437 | 437 | - | - | - | - | - | - | - | - | - | - | - |
| 2a.1 | Subtotal Period 2a Activity Costs | - | - | - | - | - | - | 572 | 121 | 693 | 693 | - | - | - | - | - | - | - | - | - | - | - |
| Period 2a Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 2a.2.1 | Security Modifications | - | - | - | - | - | - | 4,348 | 652 | 5,000 | 5,000 | - | - | - | - | - | - | - | - | - | - | - |
| 2a.2 | Subtotal Period 2a Additional Costs | - | - | - | - | - | - | 4,348 | 652 | 5,000 | 5,000 | - | - | - | - | - | - | - | - | - | - | - |
| Period 2a Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 2a.3.1 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 59,354 | 8,903 | 68,257 | - | 68,257 | - | - | - | - | - | - | - | - | - | - |
| 2a.3.2 | Retention and Severance | - | - | - | - | - | - | 11,054 | 1,658 | 12,712 | 12,712 | - | - | - | - | - | - | - | - | - | - | - |
| 2a.3.3 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 3,128 | - | 3,128 | - | 3,128 | - | - | - | - | - | - | - | - | - | - |
| 2a.3 | Subtotal Period 2a Collateral Costs | - | - | - | - | - | - | 73,536 | 10,561 | 84,097 | 12,712 | 71,385 | - | - | - | - | - | - | - | - | - | - |
| Period 2a Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 2a.4.1 | Insurance | - | - | - | - | - | - | 1,213 | 121 | 1,334 | 1,334 | - | - | - | - | - | - | - | - | - | - | - |
| 2a.4.2 | Property taxes | - | - | - | - | - | - | 9,065 | 907 | 9,972 | 9,972 | - | - | - | - | - | - | - | - | - | - | - |
| 2a.4.3 | Health physics supplies | - | 617 | - | - | - | - | - | 154 | 771 | 771 | - | - | - | - | - | - | - | - | - | - | - |
| 2a.4.4 | Disposal of DAW generated | - | - | 11 | 5 | - | 47 | - | 14 | 77 | 77 | - | - | 576 | - | - | - | - | 11,523 | 19 | - | |
| 2a.4.5 | Plant energy budget | - | - | - | - | - | - | 812 | 122 | 934 | 934 | - | - | - | - | - | - | - | - | - | - | - |
| 2a.4.6 | NRC Fees | - | - | - | - | - | - | 536 | 54 | 590 | 590 | - | - | - | - | - | - | - | - | - | - | - |
| 2a.4.7 | Emergency Planning Fees | - | - | - | - | - | - | 4,653 | 465 | 5,119 | - | 5,119 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.8 | Fixed Overhead | - | - | - | - | - | - | 2,979 | 447 | 3,426 | 3,426 | - | - | - | - | - | - | - | - | - | - | - |
| 2a.4.9 | Spent Fuel Pool O&M | - | - | - | - | - | - | 1,057 | 159 | 1,216 | - | 1,216 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.10 | ISFSI Operating Costs | - | - | - | - | - | - | 140 | 21 | 161 | - | 161 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.11 | Railroad Track Maintenance | - | - | - | - | - | - | 385 | 58 | 443 | 443 | - | - | - | - | - | - | - | - | - | - | - |
| 2a.4.12 | Security Staff Cost | - | - | - | - | - | - | 19,158 | 2,874 | 22,032 | 15,863 | 6,169 | - | - | - | - | - | - | - | - | - | 281,262 |
| 2a.4.13 | Utility Staff Cost | - | - | - | - | - | - | 13,370 | 2,006 | 15,376 | 12,900 | 2,476 | - | - | - | - | - | - | - | - | - | 205,738 |
| 2a.4 | Subtotal Period 2a Period-Dependent Costs | - | 617 | 11 | 5 | - | 47 | 53,370 | 7,400 | 61,450 | 46,309 | 15,140 | - | - | 576 | - | - | - | 11,523 | 19 | 486,999 | |
| 2a.0 | TOTAL PERIOD 2a COST | - | 617 | 11 | 5 | - | 47 | 131,825 | 18,734 | 151,240 | 64,714 | 86,525 | - | - | 576 | - | - | - | 11,523 | 19 | 486,999 | |
| PERIOD 2b - SAFSTOR Dormancy with Dry Spent Fuel Storage | | | | | | | | | | | | | | | | | | | | | | |
| Period 2b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| 2b.1.1 | Quarterly Inspection | - | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 2b.1.2 | Semi-annual environmental survey | - | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 2b.1.3 | Prepare reports | - | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 2b.1.4 | Bituminous roof replacement | - | - | - | - | - | - | 3,222 | 483 | 3,705 | 3,705 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.1.5 | Maintenance supplies | - | - | - | - | - | - | 5,052 | 1,263 | 6,315 | 6,315 | - | - | - | - | - | - | - | - | - | - | - |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table G-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with DOE Pickup of Industry Spent Fuel Starting in 2035
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|--|--|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|-----------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| 2b.1 | Subtotal Period 2b Activity Costs | - | - | - | - | - | - | 8,274 | 1,746 | 10,020 | 10,020 | - | - | - | - | - | - | - | - | - | - | - |
| Period 2b Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 2b.3.1 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 15,884 | 2,383 | 18,267 | - | 18,267 | - | - | - | - | - | - | - | - | - | - |
| 2b.3.2 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 45,219 | - | 45,219 | - | 45,219 | - | - | - | - | - | - | - | - | - | - |
| 2b.3 | Subtotal Period 2b Collateral Costs | - | - | - | - | - | - | 61,103 | 2,383 | 63,486 | - | 63,486 | - | - | - | - | - | - | - | - | - | - |
| Period 2b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 2b.4.1 | Insurance | - | - | - | - | - | - | 17,530 | 1,753 | 19,283 | 19,283 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.2 | Property taxes | - | - | - | - | - | - | 131,056 | 13,106 | 144,162 | 144,162 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.3 | Health physics supplies | - | 4,112 | - | - | - | - | - | 1,028 | 5,140 | 5,140 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.4 | Disposal of DAW generated | - | - | 74 | 30 | - | 308 | - | 89 | 501 | 501 | - | - | - | 3,739 | - | - | - | - | 74,786 | 122 | - |
| 2b.4.5 | Plant energy budget | - | - | - | - | - | - | 5,869 | 880 | 6,749 | 6,749 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.6 | NRC Fees | - | - | - | - | - | - | 7,459 | 746 | 8,205 | 8,205 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.7 | Emergency Planning Fees | - | - | - | - | - | - | 2,684 | 268 | 2,952 | - | 2,952 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.8 | Fixed Overhead | - | - | - | - | - | - | 5,898 | 885 | 6,783 | 6,783 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.9 | ISFSI Operating Costs | - | - | - | - | - | - | 2,026 | 304 | 2,330 | - | 2,330 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.10 | Railroad Track Maintenance | - | - | - | - | - | - | 2,263 | 339 | 2,603 | 2,603 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.11 | Security Staff Cost | - | - | - | - | - | - | 101,034 | 15,155 | 116,189 | 25,562 | 90,627 | - | - | - | - | - | - | - | - | - | 1,355,328 |
| 2b.4.12 | Utility Staff Cost | - | - | - | - | - | - | 49,438 | 7,416 | 56,854 | 35,704 | 21,150 | - | - | - | - | - | - | - | - | - | 752,960 |
| 2b.4 | Subtotal Period 2b Period-Dependent Costs | - | 4,112 | 74 | 30 | - | 308 | 325,257 | 41,969 | 371,750 | 254,691 | 117,059 | - | - | 3,739 | - | - | - | - | 74,786 | 122 | 2,108,288 |
| 2b.0 | TOTAL PERIOD 2b COST | - | 4,112 | 74 | 30 | - | 308 | 394,634 | 46,098 | 445,256 | 264,712 | 180,544 | - | - | 3,739 | - | - | - | - | 74,786 | 122 | 2,108,288 |
| PERIOD 2c - SAFSTOR Dormancy without Spent Fuel Storage | | | | | | | | | | | | | | | | | | | | | | |
| Period 2c Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| 2c.1.1 | Quarterly Inspection | - | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 2c.1.2 | Semi-annual environmental survey | - | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 2c.1.3 | Prepare reports | - | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 2c.1.4 | Bituminous roof replacement | - | - | - | - | - | - | 1,180 | 177 | 1,357 | 1,357 | - | - | - | - | - | - | - | - | - | - | - |
| 2c.1.5 | Maintenance supplies | - | - | - | - | - | - | 1,851 | 463 | 2,313 | 2,313 | - | - | - | - | - | - | - | - | - | - | - |
| 2c.1 | Subtotal Period 2c Activity Costs | - | - | - | - | - | - | 3,031 | 640 | 3,671 | 3,671 | - | - | - | - | - | - | - | - | - | - | - |
| Period 2c Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 2c.4.1 | Insurance | - | - | - | - | - | - | 3,705 | 370 | 4,075 | 4,075 | - | - | - | - | - | - | - | - | - | - | - |
| 2c.4.2 | Property taxes | - | - | - | - | - | - | 30,788 | 3,079 | 33,867 | 33,867 | - | - | - | - | - | - | - | - | - | - | - |
| 2c.4.3 | Health physics supplies | - | 1,428 | - | - | - | - | - | 357 | 1,785 | 1,785 | - | - | - | - | - | - | - | - | - | - | - |
| 2c.4.4 | Disposal of DAW generated | - | - | 25 | 10 | - | 105 | - | 30 | 171 | 171 | - | - | 1,274 | - | - | - | - | - | 25,478 | 42 | - |
| 2c.4.5 | Plant energy budget | - | - | - | - | - | - | 2,150 | 322 | 2,472 | 2,472 | - | - | - | - | - | - | - | - | - | - | - |
| 2c.4.6 | NRC Fees | - | - | - | - | - | - | 2,606 | 261 | 2,866 | 2,866 | - | - | - | - | - | - | - | - | - | - | - |
| 2c.4.7 | Fixed Overhead | - | - | - | - | - | - | 2,161 | 324 | 2,485 | 2,485 | - | - | - | - | - | - | - | - | - | - | - |
| 2c.4.8 | Railroad Track Maintenance | - | - | - | - | - | - | 829 | 124 | 953 | 953 | - | - | - | - | - | - | - | - | - | - | - |
| 2c.4.9 | Utility Staff Cost | - | - | - | - | - | - | 6,584 | 988 | 7,572 | 7,572 | - | - | - | - | - | - | - | - | - | - | 110,326 |
| 2c.4 | Subtotal Period 2c Period-Dependent Costs | - | 1,428 | 25 | 10 | - | 105 | 48,823 | 5,856 | 56,247 | 56,247 | - | - | 1,274 | - | - | - | - | - | 25,478 | 42 | 110,326 |
| 2c.0 | TOTAL PERIOD 2c COST | - | 1,428 | 25 | 10 | - | 105 | 51,854 | 6,496 | 59,918 | 59,918 | - | - | 1,274 | - | - | - | - | - | 25,478 | 42 | 110,326 |
| PERIOD 2 TOTALS | | | | | | | | | | | | | | | | | | | | | | |
| - | | - | 6,157 | 111 | 45 | - | 461 | 578,313 | 71,327 | 656,413 | 389,344 | 267,069 | - | - | 5,589 | - | - | - | - | 111,786 | 182 | 2,705,613 |
| PERIOD 3a - Reactivate Site Following SAFSTOR Dormancy | | | | | | | | | | | | | | | | | | | | | | |
| Period 3a Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| 3a.1.1 | Prepare preliminary decommissioning cost | - | - | - | - | - | - | 71 | 11 | 82 | 82 | - | - | - | - | - | - | - | - | - | - | 556 |
| 3a.1.2 | Review plant dwgs & specs. | - | - | - | - | - | - | 253 | 38 | 291 | 291 | - | - | - | - | - | - | - | - | - | - | 1,967 |
| 3a.1.3 | Perform detailed rad survey | - | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 3a.1.4 | End product description | - | - | - | - | - | - | 55 | 8 | 63 | 63 | - | - | - | - | - | - | - | - | - | - | 428 |
| 3a.1.5 | Detailed by-product inventory | - | - | - | - | - | - | 71 | 11 | 82 | 82 | - | - | - | - | - | - | - | - | - | - | 556 |
| 3a.1.6 | Define major work sequence | - | - | - | - | - | - | 412 | 62 | 474 | 474 | - | - | - | - | - | - | - | - | - | - | 3,207 |
| 3a.1.7 | Perform SER and EA | - | - | - | - | - | - | 170 | 26 | 196 | 196 | - | - | - | - | - | - | - | - | - | - | 1,326 |
| 3a.1.8 | Prepare/submit Defueled Technical Specifications | - | - | - | - | - | - | 412 | 62 | 474 | 474 | - | - | - | - | - | - | - | - | - | - | 3,207 |
| 3a.1.9 | Perform Site-Specific Cost Study | - | - | - | - | - | - | 275 | 41 | 316 | 316 | - | - | - | - | - | - | - | - | - | - | 2,138 |
| 3a.1.10 | Prepare/submit Irradiated Fuel Management Plan | - | - | - | - | - | - | 55 | 8 | 63 | 63 | - | - | - | - | - | - | - | - | - | - | 428 |
| Activity Specifications | | | | | | | | | | | | | | | | | | | | | | |
| 3a.1.11.1 | Re-activate plant & temporary facilities | - | - | - | - | - | - | 405 | 61 | 466 | 419 | - | - | 47 | - | - | - | - | - | - | - | 3,151 |
| 3a.1.11.2 | Plant systems | - | - | - | - | - | - | 229 | 34 | 263 | 237 | - | - | 26 | - | - | - | - | - | - | - | 1,782 |
| 3a.1.11.3 | Reactor internals | - | - | - | - | - | - | 390 | 59 | 449 | 449 | - | - | - | - | - | - | - | - | - | - | 3,036 |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table G-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with DOE Pickup of Industry Spent Fuel Starting in 2035
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|---------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| 3a.1.11.4 | Reactor vessel | - | - | - | - | - | - | 357 | 54 | 411 | 411 | - | - | - | - | - | - | - | - | - | - | 2,779 |
| 3a.1.11.5 | Biological shield | - | - | - | - | - | - | 27 | 4 | 32 | 32 | - | - | - | - | - | - | - | - | - | - | 214 |
| 3a.1.11.6 | Steam generators | - | - | - | - | - | - | 171 | 26 | 197 | 197 | - | - | - | - | - | - | - | - | - | - | 1,334 |
| Activity Specifications (continued) | | | | | | | | | | | | | | | | | | | | | | |
| 3a.1.11.7 | Reinforced concrete | - | - | - | - | - | - | 88 | 13 | 101 | 51 | - | 51 | - | - | - | - | - | - | - | - | 684 |
| 3a.1.11.8 | Main Turbine | - | - | - | - | - | - | 22 | 3 | 25 | - | - | 25 | - | - | - | - | - | - | - | - | 171 |
| 3a.1.11.9 | Main Condensers | - | - | - | - | - | - | 22 | 3 | 25 | - | - | 25 | - | - | - | - | - | - | - | - | 171 |
| 3a.1.11.10 | Plant structures & buildings | - | - | - | - | - | - | 171 | 26 | 197 | 99 | - | 99 | - | - | - | - | - | - | - | - | 1,334 |
| 3a.1.11.11 | Waste management | - | - | - | - | - | - | 253 | 38 | 291 | 291 | - | - | - | - | - | - | - | - | - | - | 1,967 |
| 3a.1.11.12 | Facility & site closeout | - | - | - | - | - | - | 49 | 7 | 57 | 28 | - | 28 | - | - | - | - | - | - | - | - | 385 |
| 3a.1.11 | Total | - | - | - | - | - | - | 2,186 | 328 | 2,514 | 2,213 | - | 301 | - | - | - | - | - | - | - | - | 17,009 |
| Planning & Site Preparations | | | | | | | | | | | | | | | | | | | | | | |
| 3a.1.12 | Prepare dismantling sequence | - | - | - | - | - | - | 132 | 20 | 152 | 152 | - | - | - | - | - | - | - | - | - | - | 1,026 |
| 3a.1.13 | Plant prep. & temp. svces | - | - | - | - | - | - | 3,500 | 525 | 4,025 | 4,025 | - | - | - | - | - | - | - | - | - | - | - |
| 3a.1.14 | Design water clean-up system | - | - | - | - | - | - | 77 | 12 | 88 | 88 | - | - | - | - | - | - | - | - | - | - | 599 |
| 3a.1.15 | Rigging/Cont. Cntrl Envlp/tooling/etc. | - | - | - | - | - | - | 2,400 | 360 | 2,760 | 2,760 | - | - | - | - | - | - | - | - | - | - | - |
| 3a.1.16 | Procure casks/liners & containers | - | - | - | - | - | - | 68 | 10 | 78 | 78 | - | - | - | - | - | - | - | - | - | - | 526 |
| 3a.1 | Subtotal Period 3a Activity Costs | - | - | - | - | - | - | 10,137 | 1,521 | 11,658 | 11,357 | - | 301 | - | - | - | - | - | - | - | - | 32,971 |
| Period 3a Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3a.2.1 | Site Characterization | - | - | - | - | - | - | 1,505 | 451 | 1,956 | 1,956 | - | - | - | - | - | - | - | - | - | 8,988 | 3,563 |
| 3a.2.2 | Mixed/Hazardous Waste | - | - | 353 | 94 | 178 | - | - | 76 | 702 | 702 | - | - | 6,132 | - | - | - | - | - | 351,977 | 2,348 | - |
| 3a.2.3 | Asbestos Abatement | - | 2,526 | 3 | 150 | - | 1,369 | - | 996 | 5,044 | 5,044 | - | - | - | 12,843 | - | - | - | - | 166,959 | 20,907 | - |
| 3a.2 | Subtotal Period 3a Additional Costs | - | 2,526 | 356 | 244 | 178 | 1,369 | 1,505 | 1,524 | 7,702 | 7,702 | - | - | 6,132 | 12,843 | - | - | - | - | 518,936 | 32,243 | 3,563 |
| Period 3a Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3a.3.1 | Small tool allowance | - | 34 | - | - | - | - | - | 5 | 39 | 39 | - | - | - | - | - | - | - | - | - | - | - |
| 3a.3 | Subtotal Period 3a Collateral Costs | - | 34 | - | - | - | - | - | 5 | 39 | 39 | - | - | - | - | - | - | - | - | - | - | - |
| Period 3a Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3a.4.1 | Insurance | - | - | - | - | - | - | 279 | 28 | 307 | 307 | - | - | - | - | - | - | - | - | - | - | - |
| 3a.4.2 | Property taxes | - | - | - | - | - | - | 2,249 | 225 | 2,474 | 2,474 | - | - | - | - | - | - | - | - | - | - | - |
| 3a.4.3 | Health physics supplies | - | 641 | - | - | - | - | - | 160 | 802 | 802 | - | - | - | - | - | - | - | - | - | - | - |
| 3a.4.4 | Heavy equipment rental | - | 753 | - | - | - | - | - | 113 | 866 | 866 | - | - | - | - | - | - | - | - | - | - | - |
| 3a.4.5 | Disposal of DAW generated | - | - | 10 | 4 | - | 40 | - | 11 | 64 | 64 | - | - | - | 481 | - | - | - | - | 9,613 | 16 | - |
| 3a.4.6 | Plant energy budget | - | - | - | - | - | - | 1,621 | 243 | 1,864 | 1,864 | - | - | - | - | - | - | - | - | - | - | - |
| 3a.4.7 | NRC Fees | - | - | - | - | - | - | 260 | 26 | 286 | 286 | - | - | - | - | - | - | - | - | - | - | - |
| 3a.4.8 | Fixed Overhead | - | - | - | - | - | - | 1,440 | 216 | 1,656 | 1,656 | - | - | - | - | - | - | - | - | - | - | - |
| 3a.4.9 | Railroad Track Maintenance | - | - | - | - | - | - | 63 | 9 | 72 | 72 | - | - | - | - | - | - | - | - | - | - | - |
| 3a.4.10 | Security Staff Cost | - | - | - | - | - | - | 368 | 55 | 424 | 424 | - | - | - | - | - | - | - | - | - | - | 6,240 |
| 3a.4.11 | Utility Staff Cost | - | - | - | - | - | - | 12,056 | 1,808 | 13,864 | 13,864 | - | - | - | - | - | - | - | - | - | - | 199,680 |
| 3a.4 | Subtotal Period 3a Period-Dependent Costs | - | 1,394 | 10 | 4 | - | 40 | 18,336 | 2,896 | 22,679 | 22,679 | - | - | - | 481 | - | - | - | - | 9,613 | 16 | 205,920 |
| 3a.0 | TOTAL PERIOD 3a COST | - | 3,954 | 366 | 248 | 178 | 1,409 | 29,979 | 5,946 | 42,079 | 41,778 | - | 301 | 6,132 | 13,324 | - | - | - | - | 528,549 | 32,259 | 242,454 |
| PERIOD 3b - Decommissioning Preparations | | | | | | | | | | | | | | | | | | | | | | |
| Period 3b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Detailed Work Procedures | | | | | | | | | | | | | | | | | | | | | | |
| 3b.1.1.1 | Plant systems | - | - | - | - | - | - | 260 | 39 | 299 | 269 | - | 30 | - | - | - | - | - | - | - | - | 2,024 |
| 3b.1.1.2 | Reactor internals | - | - | - | - | - | - | 137 | 21 | 158 | 158 | - | - | - | - | - | - | - | - | - | - | 1,069 |
| 3b.1.1.3 | Remaining buildings | - | - | - | - | - | - | 74 | 11 | 85 | 21 | - | 64 | - | - | - | - | - | - | - | - | 577 |
| 3b.1.1.4 | CRD cooling assembly | - | - | - | - | - | - | 55 | 8 | 63 | 63 | - | - | - | - | - | - | - | - | - | - | 428 |
| 3b.1.1.5 | CRD housings & ICI tubes | - | - | - | - | - | - | 55 | 8 | 63 | 63 | - | - | - | - | - | - | - | - | - | - | 428 |
| 3b.1.1.6 | Incore instrumentation | - | - | - | - | - | - | 55 | 8 | 63 | 63 | - | - | - | - | - | - | - | - | - | - | 428 |
| 3b.1.1.7 | Reactor vessel | - | - | - | - | - | - | 199 | 30 | 229 | 229 | - | - | - | - | - | - | - | - | - | - | 1,552 |
| 3b.1.1.8 | Facility closeout | - | - | - | - | - | - | 66 | 10 | 76 | 38 | - | 38 | - | - | - | - | - | - | - | - | 513 |
| 3b.1.1.9 | Missile shields | - | - | - | - | - | - | 25 | 4 | 28 | 28 | - | - | - | - | - | - | - | - | - | - | 192 |
| 3b.1.1.10 | Biological shield | - | - | - | - | - | - | 66 | 10 | 76 | 76 | - | - | - | - | - | - | - | - | - | - | 513 |
| 3b.1.1.11 | Steam generators | - | - | - | - | - | - | 253 | 38 | 291 | 291 | - | - | - | - | - | - | - | - | - | - | 1,967 |
| 3b.1.1.12 | Reinforced concrete | - | - | - | - | - | - | 55 | 8 | 63 | 32 | - | 32 | - | - | - | - | - | - | - | - | 428 |
| 3b.1.1.13 | Main Turbine | - | - | - | - | - | - | 86 | 13 | 99 | - | - | 99 | - | - | - | - | - | - | - | - | 667 |
| 3b.1.1.14 | Main Condensers | - | - | - | - | - | - | 86 | 13 | 99 | - | - | 99 | - | - | - | - | - | - | - | - | 667 |
| 3b.1.1.15 | Auxiliary building | - | - | - | - | - | - | 150 | 23 | 173 | 155 | - | 17 | - | - | - | - | - | - | - | - | 1,167 |
| 3b.1.1.16 | Reactor building | - | - | - | - | - | - | 150 | 23 | 173 | 155 | - | 17 | - | - | - | - | - | - | - | - | 1,167 |
| 3b.1.1 | Total | - | - | - | - | - | - | 1,772 | 266 | 2,038 | 1,643 | - | 395 | - | - | - | - | - | - | - | - | 13,787 |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table G-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with DOE Pickup of Industry Spent Fuel Starting in 2035
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|--|---|--------------|--------------|-----------------|-----------------|---------------------------|---------------------|---------------|-------------------|---------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|----------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| 3b.1 | Subtotal Period 3b Activity Costs | - | - | - | - | - | - | 1,772 | 266 | 2,038 | 1,643 | - | 395 | - | - | - | - | - | - | - | - | 13,787 |
| Period 3b Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3b.3.1 | Decon equipment | 1,055 | - | - | - | - | - | - | 158 | 1,213 | 1,213 | - | - | - | - | - | - | - | - | - | - | - |
| 3b.3.2 | DOC staff relocation expenses | - | - | - | - | - | - | 1,264 | 190 | 1,454 | 1,454 | - | - | - | - | - | - | - | - | - | - | - |
| 3b.3.3 | Pipe cutting equipment | - | 1,200 | - | - | - | - | - | 180 | 1,380 | 1,380 | - | - | - | - | - | - | - | - | - | - | - |
| 3b.3 | Subtotal Period 3b Collateral Costs | 1,055 | 1,200 | - | - | - | - | 1,264 | 528 | 4,047 | 4,047 | - | - | - | - | - | - | - | - | - | - | - |
| Period 3b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3b.4.1 | Decon supplies | 38 | - | - | - | - | - | - | 9 | 47 | 47 | - | - | - | - | - | - | - | - | - | - | - |
| 3b.4.2 | Insurance | - | - | - | - | - | - | 241 | 24 | 266 | 266 | - | - | - | - | - | - | - | - | - | - | - |
| 3b.4.3 | Property taxes | - | - | - | - | - | - | 1,019 | 102 | 1,121 | 1,121 | - | - | - | - | - | - | - | - | - | - | - |
| 3b.4.4 | Health physics supplies | - | 274 | - | - | - | - | - | 68 | 342 | 342 | - | - | - | - | - | - | - | - | - | - | - |
| 3b.4.5 | Heavy equipment rental | - | 375 | - | - | - | - | - | 56 | 432 | 432 | - | - | - | - | - | - | - | - | - | - | - |
| 3b.4.6 | Disposal of DAW generated | - | - | 5 | 2 | - | 22 | - | 6 | 35 | 35 | - | - | - | 264 | - | - | - | - | 5,286 | 9 | - |
| 3b.4.7 | Plant energy budget | - | - | - | - | - | - | 808 | 121 | 930 | 930 | - | - | - | - | - | - | - | - | - | - | - |
| 3b.4.8 | NRC Fees | - | - | - | - | - | - | 129 | 13 | 142 | 142 | - | - | - | - | - | - | - | - | - | - | - |
| 3b.4.9 | Fixed Overhead | - | - | - | - | - | - | 718 | 108 | 826 | 826 | - | - | - | - | - | - | - | - | - | - | - |
| 3b.4.10 | Railroad Track Maintenance | - | - | - | - | - | - | 31 | 5 | 36 | 36 | - | - | - | - | - | - | - | - | - | - | - |
| 3b.4.11 | Security Staff Cost | - | - | - | - | - | - | 184 | 28 | 211 | 211 | - | - | - | - | - | - | - | - | - | - | 3,111 |
| 3b.4.12 | DOC Staff Cost | - | - | - | - | - | - | 3,727 | 559 | 4,287 | 4,287 | - | - | - | - | - | - | - | - | - | - | 42,523 |
| 3b.4.13 | Utility Staff Cost | - | - | - | - | - | - | 6,011 | 902 | 6,913 | 6,913 | - | - | - | - | - | - | - | - | - | - | 99,566 |
| 3b.4 | Subtotal Period 3b Period-Dependent Costs | 38 | 649 | 5 | 2 | - | 22 | 12,870 | 2,002 | 15,588 | 15,588 | - | - | - | 264 | - | - | - | - | 5,286 | 9 | 145,201 |
| 3b.0 | TOTAL PERIOD 3b COST | 1,092 | 1,849 | 5 | 2 | - | 22 | 15,906 | 2,795 | 21,672 | 21,277 | - | 395 | - | 264 | - | - | - | - | 5,286 | 9 | 158,988 |
| PERIOD 3 TOTALS | | 1,092 | 5,803 | 371 | 250 | 178 | 1,430 | 45,885 | 8,741 | 63,751 | 63,054 | - | 696 | 6,132 | 13,588 | - | - | - | - | 533,835 | 32,267 | 401,442 |
| PERIOD 4a - Large Component Removal | | | | | | | | | | | | | | | | | | | | | | |
| Period 4a Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Nuclear Steam Supply System Removal | | | | | | | | | | | | | | | | | | | | | | |
| 4a.1.1.1 | Reactor Coolant Piping | 11 | 42 | 10 | 11 | 66 | 94 | - | 52 | 285 | 285 | - | - | 240 | 254 | - | - | - | - | 33,680 | 778 | - |
| 4a.1.1.2 | Pressurizer Relief Tank | 5 | 19 | 6 | 7 | 44 | 62 | - | 31 | 174 | 174 | - | - | 160 | 169 | - | - | - | - | 22,441 | 352 | - |
| 4a.1.1.3 | Reactor Coolant Pumps & Motors | 13 | 60 | 46 | 85 | - | 463 | - | 155 | 822 | 822 | - | - | - | 2,332 | - | - | - | - | 295,800 | 1,226 | 80 |
| 4a.1.1.4 | Pressurizer | - | 77 | 382 | 91 | - | 776 | - | 265 | 1,591 | 1,591 | - | - | - | 2,196 | - | - | - | - | 158,199 | 1,346 | 750 |
| 4a.1.1.5 | Steam Generators | - | 3,307 | 1,690 | 1,743 | 2,409 | 3,885 | - | 2,590 | 15,625 | 15,625 | - | - | 18,672 | 10,990 | - | - | - | - | 1,581,180 | 10,253 | 2,250 |
| 4a.1.1.6 | CRDMs/ICIs/Service Structure Removal | 63 | 248 | 205 | 44 | 326 | 454 | - | 283 | 1,623 | 1,623 | - | - | 2,138 | 2,146 | - | - | - | - | 165,025 | 4,449 | - |
| 4a.1.1.7 | Reactor Vessel Internals | 51 | 4,650 | 11,350 | 862 | - | 7,848 | 278 | 10,531 | 35,570 | 35,570 | - | - | - | 1,174 | - | 673 | - | - | 167,337 | 22,373 | 1,053 |
| 4a.1.1.8 | Vessel & Internals GTCC Disposal | - | - | - | - | - | 8,680 | - | 1,302 | 9,982 | 9,982 | - | - | - | - | - | - | 1,773 | - | 344,823 | - | - |
| 4a.1.1.9 | Reactor Vessel | - | 5,835 | 1,653 | 442 | - | 3,268 | 278 | 6,576 | 18,053 | 18,053 | - | - | - | 9,245 | - | - | - | - | 579,324 | 22,373 | 1,053 |
| 4a.1.1 | Totals | 144 | 14,237 | 15,343 | 3,284 | 2,845 | 25,531 | 556 | 21,785 | 83,725 | 83,725 | - | - | 21,210 | 28,505 | - | 673 | 1,773 | 3,347,810 | 63,151 | 5,187 | |
| Removal of Major Equipment | | | | | | | | | | | | | | | | | | | | | | |
| 4a.1.2 | Main Turbine/Generator | - | 292 | 116 | 35 | 555 | - | - | 173 | 1,170 | 1,170 | - | - | 2,243 | - | - | - | - | - | 134,601 | 4,116 | - |
| 4a.1.3 | Main Condensers | - | 2,510 | 79 | 33 | 742 | - | - | 752 | 4,115 | 4,115 | - | - | 4,000 | - | - | - | - | - | 180,000 | 34,978 | - |
| Cascading Costs from Clean Building Demolition | | | | | | | | | | | | | | | | | | | | | | |
| 4a.1.4.1 | Reactor | - | 794 | - | - | - | - | - | 119 | 913 | 913 | - | - | - | - | - | - | - | - | - | 7,589 | - |
| 4a.1.4.2 | Auxiliary | - | 221 | - | - | - | - | - | 33 | 254 | 254 | - | - | - | - | - | - | - | - | - | 1,309 | - |
| 4a.1.4.3 | Radwaste | - | 9 | - | - | - | - | - | 1 | 10 | 10 | - | - | - | - | - | - | - | - | - | 65 | - |
| 4a.1.4 | Totals | - | 1,023 | - | - | - | - | - | 154 | 1,177 | 1,177 | - | - | - | - | - | - | - | - | - | 8,963 | - |
| Disposal of Plant Systems | | | | | | | | | | | | | | | | | | | | | | |
| 4a.1.5.1 | Admin Bldg Ventilation | - | 6 | - | - | - | - | - | 1 | 7 | - | - | 7 | - | - | - | - | - | - | - | 90 | - |
| 4a.1.5.2 | Air Removal | - | 29 | - | - | - | - | - | 4 | 33 | - | - | 33 | - | - | - | - | - | - | - | 422 | - |
| 4a.1.5.3 | Auxiliary Feedwater | - | 46 | - | - | - | - | - | 7 | 53 | - | - | 53 | - | - | - | - | - | - | - | 676 | - |
| 4a.1.5.4 | Auxiliary Feedwater - RCA | - | 38 | 0 | 1 | 30 | - | - | 14 | 84 | 84 | - | - | 178 | - | - | - | - | - | 7,214 | 486 | - |
| 4a.1.5.5 | Bleed Steam | - | 90 | - | - | - | - | - | 13 | 103 | - | - | 103 | - | - | - | - | - | - | - | 1,331 | - |
| 4a.1.5.6 | Caustic Addition - RCA | - | 40 | 0 | 2 | 40 | - | - | 16 | 99 | 99 | - | - | 240 | - | - | - | - | - | 9,761 | 468 | - |
| 4a.1.5.7 | Chemical Feed | - | 17 | - | - | - | - | - | 3 | 20 | - | - | 20 | - | - | - | - | - | - | - | 261 | - |
| 4a.1.5.8 | Chemical Feed - RCA | - | 3 | 0 | 0 | 3 | - | - | 1 | 7 | 7 | - | - | 16 | - | - | - | - | - | 634 | 31 | - |
| 4a.1.5.9 | Circulating Water | - | 27 | - | - | - | - | - | 4 | 32 | - | - | 32 | - | - | - | - | - | - | - | 401 | - |
| 4a.1.5.10 | Condensate | - | 525 | - | - | - | - | - | 79 | 603 | - | - | 603 | - | - | - | - | - | - | - | 7,537 | - |
| 4a.1.5.11 | Condensate Polishing | - | 208 | - | - | - | - | - | 31 | 239 | - | - | 239 | - | - | - | - | - | - | - | 2,987 | - |
| 4a.1.5.12 | Condensate Polishing - RCA | - | 38 | 1 | 4 | 81 | - | - | 22 | 145 | 145 | - | - | 483 | - | - | - | - | - | 19,616 | 493 | - |
| 4a.1.5.13 | Electro-Hydraulic | - | 10 | - | - | - | - | - | 1 | 11 | - | - | 11 | - | - | - | - | - | - | - | 143 | - |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table G-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with DOE Pickup of Industry Spent Fuel Starting in 2035
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|---------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| Disposal of Plant Systems (continued) | | | | | | | | | | | | | | | | | | | | | | |
| 4a.1.5.14 | External Circulating Water | - | 26 | - | - | - | - | - | 4 | 30 | - | - | 30 | - | - | - | - | - | - | - | 385 | - |
| 4a.1.5.15 | External Circulating Water - RCA | - | 72 | 1 | 5 | 121 | - | - | 37 | 237 | 237 | - | - | 721 | - | - | - | - | - | 29,284 | 938 | - |
| 4a.1.5.16 | Feedwater | - | 127 | - | - | - | - | - | 19 | 146 | - | - | 146 | - | - | - | - | - | - | - | 1,840 | - |
| 4a.1.5.17 | Feedwater - RCA | - | 248 | 8 | 31 | 694 | - | - | 171 | 1,152 | 1,152 | - | - | 4,147 | - | - | - | - | - | 168,414 | 3,377 | - |
| 4a.1.5.18 | Gland Seal | - | 34 | - | - | - | - | - | 5 | 39 | - | - | 39 | - | - | - | - | - | - | - | 504 | - |
| 4a.1.5.19 | Heater Drain | - | 384 | - | - | - | - | - | 58 | 441 | - | - | 441 | - | - | - | - | - | - | - | 5,638 | - |
| 4a.1.5.20 | Hypobromous Acid Feed | - | 6 | - | - | - | - | - | 1 | 7 | - | - | 7 | - | - | - | - | - | - | - | 86 | - |
| 4a.1.5.21 | Hypobromous Acid Feed - RCA | - | 1 | 0 | 0 | 0 | - | - | 0 | 2 | 2 | - | - | 2 | - | - | - | - | - | 100 | 12 | - |
| 4a.1.5.22 | Internal Circ Water & CDSR | - | 25 | - | - | - | - | - | 4 | 29 | - | - | 29 | - | - | - | - | - | - | - | 366 | - |
| 4a.1.5.23 | Main Gen/Exciter/Transformer | - | 0 | - | - | - | - | - | 0 | 0 | - | - | 0 | - | - | - | - | - | - | - | 5 | - |
| 4a.1.5.24 | Main Steam | - | 101 | - | - | - | - | - | 15 | 116 | - | - | 116 | - | - | - | - | - | - | - | 1,482 | - |
| 4a.1.5.25 | Main Steam - RCA | - | 380 | 11 | 38 | 864 | - | - | 231 | 1,525 | 1,525 | - | - | 5,166 | - | - | - | - | - | 209,799 | 5,146 | - |
| 4a.1.5.26 | Repairable Spare Snubbers | - | 6 | 0 | 0 | 2 | - | - | 2 | 10 | 10 | - | - | 12 | - | - | - | - | - | 490 | 82 | - |
| 4a.1.5.27 | Steam Exclusion | - | 2 | - | - | - | - | - | 0 | 2 | - | - | 2 | - | - | - | - | - | - | - | 32 | - |
| 4a.1.5.28 | Steam Exclusion - RCA | - | 4 | 0 | 0 | 4 | - | - | 2 | 10 | 10 | - | - | 24 | - | - | - | - | - | 966 | 47 | - |
| 4a.1.5.29 | Steam Generator Blowdown | - | 378 | 21 | 27 | 319 | 215 | - | 202 | 1,162 | 1,162 | - | - | 1,906 | 631 | - | - | - | - | 118,130 | 5,179 | - |
| 4a.1.5.30 | Steam Generators | - | 5 | - | - | - | - | - | 1 | 6 | - | - | 6 | - | - | - | - | - | - | - | 75 | - |
| 4a.1.5.31 | Turbine & Moisture Separators | - | 377 | - | - | - | - | - | 57 | 434 | - | - | 434 | - | - | - | - | - | - | - | 5,472 | - |
| 4a.1.5.32 | Turbine Oil Purification | - | 53 | - | - | - | - | - | 8 | 61 | - | - | 61 | - | - | - | - | - | - | - | 757 | - |
| 4a.1.5.33 | Water Treatment | - | 453 | - | - | - | - | - | 68 | 521 | - | - | 521 | - | - | - | - | - | - | - | 6,677 | - |
| 4a.1.5.34 | Water Treatment - RCA | - | 20 | 0 | 1 | 19 | - | - | 8 | 49 | 49 | - | - | 115 | - | - | - | - | - | 4,652 | 252 | - |
| 4a.1.5 | Totals | - | 3,779 | 43 | 108 | 2,177 | 215 | - | 1,091 | 7,413 | 4,480 | - | 2,933 | 13,010 | 631 | - | - | - | - | 569,060 | 53,681 | - |
| 4a.1.6 | Scaffolding in support of decommissioning | - | 2,865 | 22 | 10 | 188 | 30 | - | 755 | 3,870 | 3,870 | - | - | 1,012 | 89 | - | - | - | - | 51,216 | 23,719 | - |
| 4a.1 | Subtotal Period 4a Activity Costs | 144 | 24,706 | 15,603 | 3,470 | 6,506 | 25,776 | 556 | 24,709 | 101,471 | 98,537 | - | 2,933 | 41,476 | 29,226 | - | 673 | 1,773 | 4,282,686 | 188,606 | 5,187 | - |
| Period 4a Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 4a.2.1 | Retired RPV Upper Internals Package | - | 128 | 166 | 58 | - | 1,583 | - | 944 | 2,879 | 2,879 | - | - | - | 572 | 125 | - | - | - | 49,800 | 1,667 | 67 |
| 4a.2 | Subtotal Period 4a Additional Costs | - | 128 | 166 | 58 | - | 1,583 | - | 944 | 2,879 | 2,879 | - | - | - | 572 | 125 | - | - | - | 49,800 | 1,667 | 67 |
| Period 4a Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 4a.3.1 | Process decommissioning water waste | 3 | - | 4 | 8 | - | 17 | - | 7 | 39 | 39 | - | - | - | 40 | - | - | - | - | 2,408 | 8 | - |
| 4a.3.3 | Small tool allowance | - | 241 | - | - | - | - | - | 36 | 277 | 249 | - | 28 | - | - | - | - | - | - | - | - | - |
| 4a.3 | Subtotal Period 4a Collateral Costs | 3 | 241 | 4 | 8 | - | 17 | - | 43 | 316 | 288 | - | 28 | - | 40 | - | - | - | - | 2,408 | 8 | - |
| Period 4a Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 4a.4.1 | Decon supplies | 100 | - | - | - | - | - | - | 25 | 125 | 125 | - | - | - | - | - | - | - | - | - | - | - |
| 4a.4.2 | Insurance | - | - | - | - | - | - | 643 | 64 | 708 | 708 | - | - | - | - | - | - | - | - | - | - | - |
| 4a.4.3 | Property taxes | - | - | - | - | - | - | 2,668 | 267 | 2,935 | 2,935 | - | - | - | - | - | - | - | - | - | - | - |
| 4a.4.4 | Health physics supplies | - | 1,881 | - | - | - | - | - | 470 | 2,351 | 2,351 | - | - | - | - | - | - | - | - | - | - | - |
| 4a.4.5 | Heavy equipment rental | - | 3,325 | - | - | - | - | - | 499 | 3,824 | 3,824 | - | - | - | - | - | - | - | - | - | - | - |
| 4a.4.6 | Disposal of DAW generated | - | - | 70 | 29 | - | 293 | - | 85 | 477 | 477 | - | - | - | 3,554 | - | - | - | - | 71,089 | 116 | - |
| 4a.4.7 | Plant energy budget | - | - | - | - | - | - | 2,047 | 307 | 2,354 | 2,354 | - | - | - | - | - | - | - | - | - | - | - |
| 4a.4.8 | NRC Fees | - | - | - | - | - | - | 420 | 42 | 461 | 461 | - | - | - | - | - | - | - | - | - | - | - |
| 4a.4.9 | Fixed Overhead | - | - | - | - | - | - | 1,581 | 237 | 1,818 | 1,818 | - | - | - | - | - | - | - | - | - | - | - |
| 4a.4.10 | Liquid Radwaste Processing Equipment/Services | - | - | - | - | - | - | 565 | 85 | 649 | 649 | - | - | - | - | - | - | - | - | - | - | - |
| 4a.4.11 | Railroad Track Maintenance | - | - | - | - | - | - | 83 | 12 | 96 | 96 | - | - | - | - | - | - | - | - | - | - | - |
| 4a.4.12 | Remedial Actions Surveys | - | - | - | - | - | - | 1,489 | 223 | 1,712 | 1,712 | - | - | - | - | - | - | - | - | - | - | - |
| 4a.4.13 | Security Staff Cost | - | - | - | - | - | - | 4,486 | 673 | 5,159 | 5,159 | - | - | - | - | - | - | - | - | - | - | 67,000 |
| 4a.4.14 | DOC Staff Cost | - | - | - | - | - | - | 17,103 | 2,565 | 19,668 | 19,668 | - | - | - | - | - | - | - | - | - | - | 189,200 |
| 4a.4.15 | Utility Staff Cost | - | - | - | - | - | - | 21,194 | 3,179 | 24,374 | 24,374 | - | - | - | - | - | - | - | - | - | - | 335,701 |
| 4a.4 | Subtotal Period 4a Period-Dependent Costs | 100 | 5,206 | 70 | 29 | - | 293 | 52,278 | 8,734 | 66,709 | 66,709 | - | - | - | 3,554 | - | - | - | - | 71,089 | 116 | 591,901 |
| 4a.0 | TOTAL PERIOD 4a COST | 246 | 30,281 | 15,844 | 3,564 | 6,506 | 27,669 | 52,834 | 34,430 | 171,375 | 168,414 | - | 2,961 | 41,476 | 33,393 | 125 | 673 | 1,773 | 4,405,984 | 190,397 | 597,154 | - |
| PERIOD 4b - Site Decontamination | | | | | | | | | | | | | | | | | | | | | | |
| Period 4b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| 4b.1.1 | Remove spent fuel racks | 314 | 35 | 86 | 41 | - | 703 | - | 356 | 1,535 | 1,535 | - | - | - | 2,092 | - | - | - | - | 132,919 | 576 | - |
| Disposal of Plant Systems | | | | | | | | | | | | | | | | | | | | | | |
| 4b.1.2.1 | ADT & Misc Ventilation | - | 22 | 1 | 1 | 26 | 3 | - | 10 | 63 | 63 | - | - | 153 | 9 | - | - | - | - | 6,803 | 325 | - |
| 4b.1.2.2 | Aux Bldg Normal Ventilation | - | 62 | 2 | 6 | 116 | 13 | - | 37 | 237 | 237 | - | - | 692 | 39 | - | - | - | - | 30,595 | 906 | - |
| 4b.1.2.3 | Aux Bldg Special Ventilation | - | 12 | 0 | 1 | 12 | 2 | - | 5 | 32 | 32 | - | - | 70 | 6 | - | - | - | - | 3,234 | 176 | - |
| 4b.1.2.4 | Battery Rm Special Ventilation | - | 2 | - | - | - | - | - | 0 | 2 | - | - | 2 | - | - | - | - | - | - | - | 24 | - |
| 4b.1.2.5 | Boron Recycle | - | 3 | 0 | 0 | 0 | 3 | - | 2 | 9 | 9 | - | - | 3 | 9 | - | - | - | - | 700 | 45 | - |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table G-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with DOE Pickup of Industry Spent Fuel Starting in 2035
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|---------------------------------------|--|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|---|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| Disposal of Plant Systems (continued) | | | | | | | | | | | | | | | | | | | | | | |
| 4b.1.2.6 | Chemical & Volume Control | - | 858 | 62 | 57 | 394 | 677 | - | 458 | 2,507 | 2,507 | - | - | 2,356 | 1,977 | - | - | - | - | 223,753 | 11,575 | - |
| 4b.1.2.7 | Cold Chemical Lab Ventilation | - | 1 | - | - | - | - | - | 0 | 1 | - | - | 1 | - | - | - | - | - | - | - | 9 | - |
| 4b.1.2.8 | Component Cooling - RCA | - | 647 | 25 | 88 | 2,007 | - | - | 479 | 3,246 | 3,246 | - | - | 11,996 | - | - | - | - | - | 487,169 | 8,583 | - |
| 4b.1.2.9 | Containment Cooling | - | 35 | - | - | - | - | - | 5 | 40 | - | - | 40 | - | - | - | - | - | - | - | 502 | - |
| 4b.1.2.10 | Containment Cooling - RCA | - | 302 | 6 | 20 | 459 | - | - | 148 | 934 | 934 | - | - | 2,743 | - | - | - | - | - | 111,390 | 3,949 | - |
| 4b.1.2.11 | Containment Hydrogen Control - RCA | - | 36 | 0 | 1 | 24 | - | - | 13 | 74 | 74 | - | - | 141 | - | - | - | - | - | 5,742 | 494 | - |
| 4b.1.2.12 | Containment Spray - RCA | - | 194 | 3 | 11 | 243 | - | - | 87 | 538 | 538 | - | - | 1,453 | - | - | - | - | - | 59,019 | 2,617 | - |
| 4b.1.2.13 | Containment Ventilation | - | 211 | 23 | 49 | 790 | 243 | - | 242 | 1,558 | 1,558 | - | - | 4,721 | 722 | - | - | - | - | 237,643 | 3,016 | - |
| 4b.1.2.14 | Control/Relay/Cmptr Rm Vent | - | 28 | 1 | 2 | 44 | 7 | - | 16 | 98 | 98 | - | - | 260 | 20 | - | - | - | - | 11,878 | 406 | - |
| 4b.1.2.15 | Cooling Water | - | 159 | - | - | - | - | - | 24 | 183 | - | - | 183 | - | - | - | - | - | - | - | 2,344 | - |
| 4b.1.2.16 | Cooling Water - RCA | - | 476 | 17 | 62 | 1,412 | - | - | 342 | 2,310 | 2,310 | - | - | 8,442 | - | - | - | - | - | 342,822 | 6,311 | - |
| 4b.1.2.17 | Cranes/Hoists/Elevators - RCA | - | 3 | 0 | 1 | 17 | - | - | 4 | 25 | 25 | - | - | 103 | - | - | - | - | - | 4,184 | 48 | - |
| 4b.1.2.18 | D3 Emergency Diesel | - | 10 | - | - | - | - | - | 2 | 12 | - | - | 12 | - | - | - | - | - | - | - | 141 | - |
| 4b.1.2.19 | D4 Emergency Diesel | - | 10 | - | - | - | - | - | 2 | 12 | - | - | 12 | - | - | - | - | - | - | - | 141 | - |
| 4b.1.2.20 | D5 Emergency Diesel | - | 0 | - | - | - | - | - | 0 | 0 | - | - | 0 | - | - | - | - | - | - | - | 5 | - |
| 4b.1.2.21 | Electrical - Clean | - | 1,714 | - | - | - | - | - | 257 | 1,972 | - | - | 1,972 | - | - | - | - | - | - | - | 24,276 | - |
| 4b.1.2.22 | Electrical - Contaminated | - | 430 | 5 | 16 | 334 | 25 | - | 167 | 978 | 978 | - | - | 1,997 | 75 | - | - | - | - | 85,887 | 5,813 | - |
| 4b.1.2.23 | Electrical - Contaminated - Fuel Pool | - | 184 | 2 | 7 | 145 | 11 | - | 72 | 421 | 421 | - | - | 864 | 33 | - | - | - | - | 37,167 | 2,488 | - |
| 4b.1.2.24 | Electrical - Decontaminated | - | 2,955 | 38 | 138 | 3,138 | - | - | 1,234 | 7,503 | 7,503 | - | - | 18,753 | - | - | - | - | - | 761,569 | 38,423 | - |
| 4b.1.2.25 | Electrical - Decontaminated - Fuel Pool | - | 1,269 | 17 | 59 | 1,350 | - | - | 530 | 3,225 | 3,225 | - | - | 8,069 | - | - | - | - | - | 327,668 | 16,495 | - |
| 4b.1.2.26 | Filter Rm Ventilation | - | 4 | 0 | 0 | 4 | 0 | - | 2 | 10 | 10 | - | - | 24 | 1 | - | - | - | - | 1,017 | 61 | - |
| 4b.1.2.27 | Fire Protection & Detection | - | 204 | - | - | - | - | - | 31 | 235 | - | - | 235 | - | - | - | - | - | - | - | 3,009 | - |
| 4b.1.2.28 | Fire Protection & Detection - RCA | - | 246 | 4 | 13 | 306 | - | - | 110 | 679 | 679 | - | - | 1,828 | - | - | - | - | - | 74,245 | 3,134 | - |
| 4b.1.2.29 | Fire Protection & Detection - RCA Fuel P | - | 37 | 1 | 2 | 48 | - | - | 17 | 105 | 105 | - | - | 286 | - | - | - | - | - | 11,622 | 476 | - |
| 4b.1.2.30 | Fuel Handling | - | 66 | 1 | 2 | 34 | 17 | - | 26 | 146 | 146 | - | - | 200 | 49 | - | - | - | - | 11,273 | 983 | - |
| 4b.1.2.31 | Fuel Oil | - | 1 | - | - | - | - | - | 0 | 1 | - | - | 1 | - | - | - | - | - | - | - | 9 | - |
| 4b.1.2.32 | HVAC - Clean | - | 151 | - | - | - | - | - | 23 | 174 | - | - | 174 | - | - | - | - | - | - | - | 2,373 | - |
| 4b.1.2.33 | HVAC - Contaminated | - | 1,112 | 29 | 87 | 1,798 | 136 | - | 598 | 3,759 | 3,759 | - | - | 10,745 | 405 | - | - | - | - | 462,103 | 14,282 | - |
| 4b.1.2.34 | HVAC - Contaminated - Fuel Pool | - | 499 | 13 | 39 | 808 | 61 | - | 268 | 1,689 | 1,689 | - | - | 4,828 | 182 | - | - | - | - | 207,612 | 6,417 | - |
| 4b.1.2.35 | Heating | - | 322 | - | - | - | - | - | 48 | 370 | - | - | 370 | - | - | - | - | - | - | - | 4,804 | - |
| 4b.1.2.36 | Heating - RCA | - | 337 | 4 | 14 | 319 | - | - | 135 | 809 | 809 | - | - | 1,907 | - | - | - | - | - | 77,458 | 4,086 | - |
| 4b.1.2.37 | Hot Lab & Sample Rm Ventilation | - | 17 | 0 | 1 | 18 | 1 | - | 8 | 46 | 46 | - | - | 107 | 4 | - | - | - | - | 4,622 | 255 | - |
| 4b.1.2.38 | Incore Instrumentation | - | 27 | 1 | 2 | 10 | 20 | - | 13 | 73 | 73 | - | - | 60 | 58 | - | - | - | - | 6,143 | 412 | - |
| 4b.1.2.39 | Misc Drains & Vents | - | 213 | 12 | 12 | 77 | 145 | - | 104 | 563 | 563 | - | - | 458 | 426 | - | - | - | - | 46,079 | 2,841 | - |
| 4b.1.2.40 | Misc Lab & Service Areas Vent | - | 118 | 8 | 8 | 62 | 84 | - | 62 | 342 | 342 | - | - | 370 | 244 | - | - | - | - | 30,899 | 1,537 | - |
| 4b.1.2.41 | Miscellaneous Gas | - | 72 | - | - | - | - | - | 11 | 83 | - | - | 83 | - | - | - | - | - | - | - | 1,073 | - |
| 4b.1.2.42 | Miscellaneous Gas - RCA | - | 134 | 1 | 4 | 100 | - | - | 49 | 289 | 289 | - | - | 600 | - | - | - | - | - | 24,378 | 1,636 | - |
| 4b.1.2.43 | Radiation Monitoring | - | 7 | - | - | - | - | - | 1 | 9 | - | - | 9 | - | - | - | - | - | - | - | 111 | - |
| 4b.1.2.44 | Radiation Monitoring - RCA | - | 65 | 1 | 2 | 53 | - | - | 25 | 145 | 145 | - | - | 316 | - | - | - | - | - | 12,826 | 782 | - |
| 4b.1.2.45 | Reactor Coolant | - | 216 | 20 | 16 | 38 | 249 | - | 126 | 666 | 666 | - | - | 229 | 730 | - | - | - | - | 56,440 | 2,891 | - |
| 4b.1.2.46 | Reactor Hot Sampling | - | 116 | 11 | 7 | 9 | 108 | - | 60 | 311 | 311 | - | - | 54 | 312 | - | - | - | - | 22,678 | 1,499 | - |
| 4b.1.2.47 | Reactor Makeup | - | 41 | - | - | - | - | - | 6 | 47 | - | - | 47 | - | - | - | - | - | - | - | 583 | - |
| 4b.1.2.48 | Reactor Makeup - RCA | - | 4 | 0 | 0 | 5 | - | - | 2 | 11 | 11 | - | - | 28 | - | - | - | - | - | 1,148 | 47 | - |
| 4b.1.2.49 | Reactor Vessel | - | 16 | 1 | 0 | 4 | 5 | - | 6 | 32 | 32 | - | - | 22 | 14 | - | - | - | - | 1,816 | 225 | - |
| 4b.1.2.50 | Residual Heat Removal | - | 354 | 84 | 86 | 477 | 1,102 | - | 457 | 2,562 | 2,562 | - | - | 2,853 | 3,244 | - | - | - | - | 324,232 | 5,039 | - |
| 4b.1.2.51 | Safeguards Chilled Water | - | 5 | - | - | - | - | - | 1 | 6 | - | - | 6 | - | - | - | - | - | - | - | 75 | - |
| 4b.1.2.52 | Safeguards Chilled Water - RCA | - | 5 | 0 | 0 | 4 | - | - | 2 | 11 | 11 | - | - | 26 | - | - | - | - | - | 1,045 | 51 | - |
| 4b.1.2.53 | Safety Injection | - | 793 | 42 | 72 | 1,117 | 395 | - | 479 | 2,898 | 2,898 | - | - | 6,676 | 1,161 | - | - | - | - | 345,708 | 11,029 | - |
| 4b.1.2.54 | Sampling | - | 48 | 3 | 2 | 6 | 32 | - | 22 | 113 | 113 | - | - | 37 | 93 | - | - | - | - | 7,628 | 645 | - |
| 4b.1.2.55 | Service Bldg & New Cmptr Vent | - | 0 | - | - | - | - | - | 0 | 0 | - | - | 0 | - | - | - | - | - | - | - | 6 | - |
| 4b.1.2.56 | Shield Bldg Ventilation | - | 108 | 13 | 25 | 339 | 163 | - | 124 | 771 | 771 | - | - | 2,028 | 484 | - | - | - | - | 113,139 | 1,555 | - |
| 4b.1.2.57 | Spent Fuel Pool Cooling | - | 33 | 3 | 2 | 6 | 37 | - | 19 | 101 | 101 | - | - | 39 | 107 | - | - | - | - | 8,481 | 427 | - |
| 4b.1.2.58 | Spent Fuel Pool Normal Ventilation | - | 24 | 1 | 2 | 44 | 4 | - | 14 | 90 | 90 | - | - | 265 | 12 | - | - | - | - | 11,505 | 352 | - |
| 4b.1.2.59 | Station & Instrument Air | - | 161 | - | - | - | - | - | 24 | 185 | - | - | 185 | - | - | - | - | - | - | - | 2,424 | - |
| 4b.1.2.60 | Station & Instrument Air - RCA | - | 299 | 3 | 12 | 272 | - | - | 118 | 704 | 704 | - | - | 1,625 | - | - | - | - | - | 65,986 | 3,638 | - |
| 4b.1.2.61 | Turbine Bldg Traps & Drains | - | 30 | - | - | - | - | - | 5 | 35 | - | - | 35 | - | - | - | - | - | - | - | 462 | - |
| 4b.1.2.62 | Turbine Bldg Traps & Drains - RCA | - | 30 | 0 | 1 | 30 | - | - | 12 | 73 | 73 | - | - | 180 | - | - | - | - | - | 7,321 | 344 | - |
| 4b.1.2.63 | Turbine Bldg Ventilation | - | 46 | - | - | - | - | - | 7 | 53 | - | - | 53 | - | - | - | - | - | - | - | 655 | - |
| 4b.1.2.64 | Unit Coolers | - | 23 | - | - | - | - | - | 3 | 26 | - | - | 26 | - | - | - | - | - | - | - | 332 | - |
| 4b.1.2.65 | Unit Coolers - RCA | - | 56 | 0 | 2 | 39 | - | - | 20 | 117 | 117 | - | - | 232 | - | - | - | - | - | 9,413 | 690 | - |
| 4b.1.2.66 | Waste Gas Disposal | - | 438 | 43 | 45 | 410 | 464 | - | 298 | 1,699 | 1,699 | - | - | 2,453 | 1,358 | - | - | - | - | 187,339 | 5,879 | - |
| 4b.1.2.67 | Waste Liquid Disposal | - | 1,642 | 116 | 100 | 612 | 1,234 | - | 837 | 4,541 | 4,541 | - | - | 3,655 | 3,594 | - | - | - | - | 381,754 | 22,011 | - |
| 4b.1.2.68 | Waste Solid Disposal | - | 132 | 12 | 11 | | | | | | | | | | | | | | | | | |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table G-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with DOE Pickup of Industry Spent Fuel Starting in 2035
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|---------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| Decontamination of Site Buildings | | | | | | | | | | | | | | | | | | | | | | |
| 4b.1.4.1 | Reactor | 1,096 | 2,528 | 240 | 1,236 | 373 | 7,080 | - | 3,215 | 15,768 | 15,768 | - | - | 2,230 | 67,331 | - | - | - | - | 3,286,725 | 45,740 | - |
| 4b.1.4.2 | Auxiliary | 1,168 | 375 | 23 | 117 | 177 | 648 | - | 886 | 3,395 | 3,395 | - | - | 1,060 | 6,118 | - | - | - | - | 332,495 | 21,235 | - |
| 4b.1.4.3 | Backwash Waste Receiving Tank | - | 25 | 3 | 17 | - | 97 | - | 33 | 175 | 175 | - | - | - | 929 | - | - | - | - | 43,896 | 266 | - |
| 4b.1.4.4 | Drum Transfer & Truck Loading Enclosure | 16 | 8 | 1 | 3 | 3 | 14 | - | 15 | 59 | 59 | - | - | 19 | 135 | - | - | - | - | 7,118 | 328 | - |
| 4b.1.4.5 | LLRW Storage Enclosure | 111 | 48 | 3 | 17 | 6 | 96 | - | 95 | 377 | 377 | - | - | 38 | 920 | - | - | - | - | 44,971 | 2,151 | - |
| 4b.1.4.6 | Radwaste | 50 | 21 | 1 | 8 | 7 | 43 | - | 43 | 174 | 174 | - | - | 42 | 412 | - | - | - | - | 21,136 | 964 | - |
| 4b.1.4.7 | Resin Disposal | 15 | 11 | 1 | 3 | 14 | 14 | - | 16 | 72 | 72 | - | - | 83 | 124 | - | - | - | - | 9,271 | 340 | - |
| 4b.1.4.8 | Fuel Handling of Aux Building | 924 | 1,015 | 13 | 45 | 404 | 195 | - | 833 | 3,430 | 3,430 | - | - | 2,417 | 1,652 | - | - | - | - | 177,755 | 27,145 | - |
| 4b.1.4 | Totals | 3,380 | 4,031 | 285 | 1,445 | 985 | 8,187 | - | 5,137 | 23,450 | 23,450 | - | - | 5,889 | 77,619 | - | - | - | - | 3,923,368 | 98,170 | - |
| 4b.1.5 | Prepare/submit License Termination Plan | - | - | - | - | - | - | 225 | 34 | 259 | 259 | - | - | - | - | - | - | - | - | - | - | 1,751 |
| 4b.1.6 | Receive NRC approval of termination plan | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 4b.1 | Subtotal Period 4b Activity Costs | 3,693 | 26,240 | 1,036 | 2,594 | 18,892 | 14,312 | 225 | 15,045 | 82,037 | 78,593 | - | 3,444 | 112,746 | 95,607 | - | - | - | - | 9,427,420 | 374,358 | 1,751 |
| Period 4b Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 4b.2.1 | License Termination Survey Planning | - | - | - | - | - | - | 1,037 | 311 | 1,348 | 1,348 | - | - | - | - | - | - | - | - | - | - | 6,240 |
| 4b.2.2 | Excavation of Underground Services | - | 1,175 | - | - | - | - | 225 | 328 | 1,728 | 1,728 | - | - | - | - | - | - | - | - | - | 7,411 | - |
| 4b.2.3 | Operational Equipment | - | - | 11 | 36 | 606 | - | - | 97 | 751 | 751 | - | - | 5,880 | - | - | - | - | - | 147,000 | 16 | - |
| 4b.2.4 | License Termination ISFSI | - | 24 | 81 | 435 | - | 2,532 | 1,375 | 1,112 | 5,560 | 5,560 | - | - | - | 9,355 | - | - | - | - | 1,123,457 | 3,762 | 5,460 |
| 4b.2 | Subtotal Period 4b Additional Costs | - | 1,199 | 93 | 471 | 606 | 2,532 | 2,638 | 1,848 | 9,387 | 9,387 | - | - | 5,880 | 9,355 | - | - | - | - | 1,270,457 | 11,189 | 11,700 |
| Period 4b Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 4b.3.1 | Process decommissioning water waste | 7 | - | 12 | 21 | - | 48 | - | 20 | 107 | 107 | - | - | - | 109 | - | - | - | - | 6,547 | 21 | - |
| 4b.3.3 | Small tool allowance | - | 443 | - | - | - | - | - | 66 | 509 | 509 | - | - | - | - | - | - | - | - | - | - | - |
| 4b.3.4 | Decommissioning Equipment Disposition | - | - | 130 | 67 | 1,112 | 178 | - | 234 | 1,722 | 1,722 | - | - | 6,000 | 529 | - | - | - | - | 303,608 | 147 | - |
| 4b.3 | Subtotal Period 4b Collateral Costs | 7 | 443 | 142 | 88 | 1,112 | 225 | 1 | 320 | 2,338 | 2,338 | - | - | 6,000 | 638 | - | - | - | - | 310,155 | 168 | - |
| Period 4b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 4b.4.1 | Decon supplies | 1,449 | - | - | - | - | - | - | 362 | 1,811 | 1,811 | - | - | - | - | - | - | - | - | - | - | - |
| 4b.4.2 | Insurance | - | - | - | - | - | - | 862 | 86 | 949 | 949 | - | - | - | - | - | - | - | - | - | - | - |
| 4b.4.3 | Property taxes | - | - | - | - | - | - | 3,404 | 340 | 3,745 | 3,745 | - | - | - | - | - | - | - | - | - | - | - |
| 4b.4.4 | Health physics supplies | - | 3,232 | - | - | - | - | - | 808 | 4,041 | 4,041 | - | - | - | - | - | - | - | - | - | - | - |
| 4b.4.5 | Heavy equipment rental | - | 4,577 | - | - | - | - | - | 687 | 5,263 | 5,263 | - | - | - | - | - | - | - | - | - | - | - |
| 4b.4.6 | Disposal of DAW generated | - | - | 116 | 47 | - | 482 | - | 139 | 784 | 784 | - | - | - | 5,849 | - | - | - | - | 116,984 | 191 | - |
| 4b.4.7 | Plant energy budget | - | - | - | - | - | - | 2,165 | 325 | 2,490 | 2,490 | - | - | - | - | - | - | - | - | - | - | - |
| 4b.4.8 | NRC Fees | - | - | - | - | - | - | 562 | 56 | 618 | 618 | - | - | - | - | - | - | - | - | - | - | - |
| 4b.4.9 | Fixed Overhead | - | - | - | - | - | - | 2,118 | 318 | 2,436 | 2,436 | - | - | - | - | - | - | - | - | - | - | - |
| 4b.4.10 | Liquid Radwaste Processing Equipment/Services | - | - | - | - | - | - | 757 | 113 | 870 | 870 | - | - | - | - | - | - | - | - | - | - | - |
| 4b.4.11 | Railroad Track Maintenance | - | - | - | - | - | - | 111 | 17 | 128 | 128 | - | - | - | - | - | - | - | - | - | - | - |
| 4b.4.12 | Remedial Actions Surveys | - | - | - | - | - | - | 1,995 | 299 | 2,294 | 2,294 | - | - | - | - | - | - | - | - | - | - | - |
| 4b.4.13 | Security Staff Cost | - | - | - | - | - | - | 7,811 | 1,172 | 8,983 | 8,983 | - | - | - | - | - | - | - | - | - | - | 115,753 |
| 4b.4.14 | DOC Staff Cost | - | - | - | - | - | - | 22,641 | 3,396 | 26,038 | 26,038 | - | - | - | - | - | - | - | - | - | - | 248,175 |
| 4b.4.15 | Utility Staff Cost | - | - | - | - | - | - | 27,954 | 4,193 | 32,147 | 32,147 | - | - | - | - | - | - | - | - | - | - | 437,085 |
| 4b.4 | Subtotal Period 4b Period-Dependent Costs | 1,449 | 7,809 | 116 | 47 | - | 482 | 70,383 | 12,312 | 92,598 | 92,598 | - | - | - | 5,849 | - | - | - | - | 116,984 | 191 | 801,014 |
| 4b.0 | TOTAL PERIOD 4b COST | 5,149 | 35,691 | 1,386 | 3,201 | 20,610 | 17,552 | 73,246 | 29,526 | 186,361 | 182,916 | - | 3,444 | 124,626 | 111,449 | - | - | - | - | 11,125,020 | 385,906 | 814,465 |
| PERIOD 4f - License Termination | | | | | | | | | | | | | | | | | | | | | | |
| Period 4f Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| 4f.1.1 | ORISE confirmatory survey | - | - | - | - | - | - | 166 | 50 | 216 | 216 | - | - | - | - | - | - | - | - | - | - | - |
| 4f.1.2 | Terminate license | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 4f.1 | Subtotal Period 4f Activity Costs | - | - | - | - | - | - | 166 | 50 | 216 | 216 | - | - | - | - | - | - | - | - | - | - | - |
| Period 4f Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 4f.2.1 | License Termination Survey | - | - | - | - | - | - | 7,041 | 2,112 | 9,154 | 9,154 | - | - | - | - | - | - | - | - | - | 100,895 | 3,120 |
| 4f.2 | Subtotal Period 4f Additional Costs | - | - | - | - | - | - | 7,041 | 2,112 | 9,154 | 9,154 | - | - | - | - | - | - | - | - | - | 100,895 | 3,120 |
| Period 4f Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 4f.3.1 | DOC staff relocation expenses | - | - | - | - | - | - | 1,264 | 190 | 1,454 | 1,454 | - | - | - | - | - | - | - | - | - | - | - |
| 4f.3 | Subtotal Period 4f Collateral Costs | - | - | - | - | - | - | 1,264 | 190 | 1,454 | 1,454 | - | - | - | - | - | - | - | - | - | - | - |

**Prairie Island Nuclear Generating Plant
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**Table G-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with DOE Pickup of Industry Spent Fuel Starting in 2035
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|---|---|--------------|---------------|-----------------|-----------------|---------------------------|---------------------|----------------|-------------------|----------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|---------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| Period 4f Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 4f.4.2 | Property taxes | - | - | - | - | - | - | 1,335 | 133 | 1,468 | 1,468 | - | - | - | - | - | - | - | - | - | - | - |
| 4f.4.3 | Health physics supplies | - | 709 | - | - | - | - | - | 177 | 886 | 886 | - | - | - | - | - | - | - | - | - | - | - |
| 4f.4.4 | Disposal of DAW generated | - | - | 7 | 3 | - | 27 | - | 8 | 45 | 45 | - | - | - | 332 | - | - | - | - | 6,649 | 11 | - |
| 4f.4.5 | Plant energy budget | - | - | - | - | - | - | 243 | 36 | 279 | 279 | - | - | - | - | - | - | - | - | - | - | - |
| 4f.4.6 | NRC Fees | - | - | - | - | - | - | 263 | 26 | 290 | 290 | - | - | - | - | - | - | - | - | - | - | - |
| 4f.4.7 | Fixed Overhead | - | - | - | - | - | - | 890 | 133 | 1,023 | 1,023 | - | - | - | - | - | - | - | - | - | - | - |
| 4f.4.8 | Railroad Track Maintenance | - | - | - | - | - | - | 47 | 7 | 54 | 54 | - | - | - | - | - | - | - | - | - | - | - |
| 4f.4.9 | Security Staff Cost | - | - | - | - | - | - | 805 | 121 | 926 | 926 | - | - | - | - | - | - | - | - | - | - | 11,668 |
| 4f.4.10 | DOC Staff Cost | - | - | - | - | - | - | 4,238 | 636 | 4,874 | 4,874 | - | - | - | - | - | - | - | - | - | - | 46,283 |
| 4f.4.11 | Utility Staff Cost | - | - | - | - | - | - | 3,772 | 566 | 4,338 | 4,338 | - | - | - | - | - | - | - | - | - | - | 56,395 |
| 4f.4 | Subtotal Period 4f Period-Dependent Costs | - | 709 | 7 | 3 | - | 27 | 11,593 | 1,844 | 14,182 | 14,182 | - | - | - | 332 | - | - | - | - | 6,649 | 11 | 114,346 |
| 4f.0 | TOTAL PERIOD 4f COST | - | 709 | 7 | 3 | - | 27 | 20,064 | 4,196 | 25,006 | 25,006 | - | - | - | 332 | - | - | - | - | 6,649 | 100,906 | 117,466 |
| PERIOD 4 TOTALS | | 5,395 | 66,681 | 17,237 | 6,768 | 27,115 | 45,248 | 146,144 | 68,152 | 382,741 | 376,336 | - | 6,405 | 166,102 | 145,174 | 125 | 673 | 1,773 | 15,537,650 | 677,209 | 1,529,086 | |
| PERIOD 5b - Site Restoration | | | | | | | | | | | | | | | | | | | | | | |
| Period 5b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Demolition of Remaining Site Buildings | | | | | | | | | | | | | | | | | | | | | | |
| 5b.1.1.1 | Reactor | - | 4,645 | - | - | - | - | - | 697 | 5,342 | - | - | 5,342 | - | - | - | - | - | - | - | 44,679 | - |
| 5b.1.1.2 | Auxiliary | - | 1,993 | - | - | - | - | - | 299 | 2,291 | - | - | 2,291 | - | - | - | - | - | - | - | 11,902 | - |
| 5b.1.1.3 | Condensate Storage Tank Foundation | - | 7 | - | - | - | - | - | 1 | 8 | - | - | 8 | - | - | - | - | - | - | - | 33 | - |
| 5b.1.1.4 | Construction Warehouse & Fab Shop | - | 130 | - | - | - | - | - | 19 | 149 | - | - | 149 | - | - | - | - | - | - | - | 1,405 | - |
| 5b.1.1.5 | D3/D4 Emergency Generator | - | 14 | - | - | - | - | - | 2 | 16 | - | - | 16 | - | - | - | - | - | - | - | 84 | - |
| 5b.1.1.6 | Drum Transfer & Truck Loading Enclosure | - | 20 | - | - | - | - | - | 3 | 24 | - | - | 24 | - | - | - | - | - | - | - | 221 | - |
| 5b.1.1.7 | Hydrogen House | - | 6 | - | - | - | - | - | 1 | 7 | - | - | 7 | - | - | - | - | - | - | - | 47 | - |
| 5b.1.1.8 | LLRW Storage Enclosure | - | 128 | - | - | - | - | - | 19 | 147 | - | - | 147 | - | - | - | - | - | - | - | 853 | - |
| 5b.1.1.9 | Misc Structures 2017 | - | 2,617 | - | - | - | - | - | 393 | 3,009 | - | - | 3,009 | - | - | - | - | - | - | - | 22,582 | - |
| 5b.1.1.10 | Radwaste | - | 176 | - | - | - | - | - | 26 | 202 | - | - | 202 | - | - | - | - | - | - | - | 1,400 | - |
| 5b.1.1.11 | Resin Disposal | - | 14 | - | - | - | - | - | 2 | 16 | - | - | 16 | - | - | - | - | - | - | - | 120 | - |
| 5b.1.1.12 | Structures below 3' below grade | - | 1,785 | - | - | - | - | - | 268 | 2,052 | - | - | 2,052 | - | - | - | - | - | - | - | 9,238 | - |
| 5b.1.1.13 | Sulfuric Acid Tank Enclosure | - | 3 | - | - | - | - | - | 0 | 4 | - | - | 4 | - | - | - | - | - | - | - | 35 | - |
| 5b.1.1.14 | Turbine | - | 2,140 | - | - | - | - | - | 321 | 2,461 | - | - | 2,461 | - | - | - | - | - | - | - | 21,997 | - |
| 5b.1.1.15 | Turbine Pedestal | - | 365 | - | - | - | - | - | 55 | 420 | - | - | 420 | - | - | - | - | - | - | - | 1,857 | - |
| 5b.1.1.16 | Warehouse #2 | - | 24 | - | - | - | - | - | 4 | 27 | - | - | 27 | - | - | - | - | - | - | - | 213 | - |
| 5b.1.1.17 | Waste Neutralizing Tank House | - | 7 | - | - | - | - | - | 1 | 8 | - | - | 8 | - | - | - | - | - | - | - | 56 | - |
| 5b.1.1.18 | Waste Oil Storage | - | 9 | - | - | - | - | - | 1 | 10 | - | - | 10 | - | - | - | - | - | - | - | 70 | - |
| 5b.1.1.19 | Water Treatment | - | 324 | - | - | - | - | - | 49 | 373 | - | - | 373 | - | - | - | - | - | - | - | 2,690 | - |
| 5b.1.1.20 | Fuel Handling of Aux Building | - | 1,095 | - | - | - | - | - | 164 | 1,259 | - | - | 1,259 | - | - | - | - | - | - | - | 8,240 | - |
| 5b.1.1 | Totals | - | 15,501 | - | - | - | - | - | 2,325 | 17,826 | - | - | 17,826 | - | - | - | - | - | - | - | 127,723 | - |
| Site Closeout Activities | | | | | | | | | | | | | | | | | | | | | | |
| 5b.1.2 | Remove Rubble | - | 1,517 | - | - | - | - | - | 228 | 1,745 | - | - | 1,745 | - | - | - | - | - | - | - | 7,408 | - |
| 5b.1.3 | Grade & landscape site | - | 448 | - | - | - | - | - | 67 | 515 | - | - | 515 | - | - | - | - | - | - | - | 921 | - |
| 5b.1.4 | Final report to NRC | - | - | - | - | - | - | 86 | 13 | 99 | 99 | - | - | - | - | - | - | - | - | - | - | 667 |
| 5b.1 | Subtotal Period 5b Activity Costs | - | 17,466 | - | - | - | - | 86 | 2,633 | 20,185 | 99 | - | 20,086 | - | - | - | - | - | - | - | 136,051 | 667 |
| Period 5b Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 5b.2.1 | Clean Concrete Disposal | - | 4,912 | - | - | - | - | 10 | 738 | 5,660 | - | - | 5,660 | - | - | - | - | - | - | - | 18,372 | - |
| 5b.2.2 | Intake Structure Cofferdam | - | 442 | - | - | - | - | - | 66 | 508 | - | - | 508 | - | - | - | - | - | - | - | 3,552 | - |
| 5b.2.3 | Construction Debris | - | - | - | - | - | - | 2,150 | 323 | 2,473 | - | - | 2,473 | - | - | - | - | - | - | - | - | - |
| 5b.2.4 | Backfill | - | 9,257 | - | - | - | - | - | 1,388 | 10,645 | - | - | 10,645 | - | - | - | - | - | - | - | 9,327 | - |
| 5b.2.5 | Demolition and Site Restoration of ISFSI | - | 515 | - | - | - | - | 68 | 87 | 670 | - | - | 670 | - | - | - | - | - | - | - | 2,219 | 80 |
| 5b.2 | Subtotal Period 5b Additional Costs | - | 15,125 | - | - | - | - | 2,227 | 2,603 | 19,955 | - | - | 19,955 | - | - | - | - | - | - | - | 33,470 | 80 |
| Period 5b Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 5b.3.1 | Small tool allowance | - | 216 | - | - | - | - | - | 32 | 249 | - | - | 249 | - | - | - | - | - | - | - | - | - |
| 5b.3 | Subtotal Period 5b Collateral Costs | - | 216 | - | - | - | - | - | 32 | 249 | - | - | 249 | - | - | - | - | - | - | - | - | - |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table G-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with DOE Pickup of Industry Spent Fuel Starting in 2035
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|-----------------------------------|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|---------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| Period 5b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 5b.4.2 | Property taxes | - | - | - | - | - | - | 3,481 | 348 | 3,829 | - | - | 3,829 | - | - | - | - | - | - | - | - | - |
| 5b.4.3 | Heavy equipment rental | - | 7,144 | - | - | - | - | - | 1,072 | 8,215 | - | - | 8,215 | - | - | - | - | - | - | - | - | - |
| 5b.4.4 | Plant energy budget | - | - | - | - | - | - | 344 | 52 | 395 | - | - | 395 | - | - | - | - | - | - | - | - | - |
| 5b.4.5 | Fixed Overhead | - | - | - | - | - | - | 1,024 | 154 | 1,178 | - | - | 1,178 | - | - | - | - | - | - | - | - | - |
| 5b.4.6 | Railroad Track Maintenance | - | - | - | - | - | - | 133 | 20 | 152 | - | - | 152 | - | - | - | - | - | - | - | - | - |
| 5b.4.7 | Security Staff Cost | - | - | - | - | - | - | 2,055 | 308 | 2,363 | - | - | 2,363 | - | - | - | - | - | - | - | - | 29,221 |
| 5b.4.8 | DOC Staff Cost | - | - | - | - | - | - | 10,921 | 1,638 | 12,559 | - | - | 12,559 | - | - | - | - | - | - | - | - | 116,885 |
| 5b.4.9 | Utility Staff Cost | - | - | - | - | - | - | 3,831 | 575 | 4,406 | - | - | 4,406 | - | - | - | - | - | - | - | - | 57,340 |
| 5b.4 | Subtotal Period 5b Period-Dependent Costs | - | 7,144 | - | - | - | - | 21,789 | 4,166 | 33,099 | - | - | 33,099 | - | - | - | - | - | - | - | - | 203,445 |
| 5b.0 | TOTAL PERIOD 5b COST | - | 39,951 | - | - | - | - | 24,102 | 9,434 | 73,487 | 99 | - | 73,389 | - | - | - | - | - | - | - | 169,521 | 204,192 |
| PERIOD 5 TOTALS | | - | 39,951 | - | - | - | - | 24,102 | 9,434 | 73,487 | 99 | - | 73,389 | - | - | - | - | - | - | - | 169,521 | 204,192 |
| TOTAL COST TO DECOMMISSION | | 12,732 | 121,667 | 17,878 | 7,311 | 27,293 | 47,786 | 890,729 | 174,619 | 1,300,016 | 944,187 | 275,338 | 80,490 | 172,234 | 166,965 | 125 | 673 | 1,773 | 16,284,450 | 947,658 | 5,651,326 | |

| | | |
|--|--------------------|----------------------------------|
| TOTAL COST TO DECOMMISSION WITH 15.52% CONTINGENCY: | \$1,300,016 | thousands of 2020 dollars |
| TOTAL NRC LICENSE TERMINATION COST IS 72.63% OR: | \$944,187 | thousands of 2020 dollars |
| SPENT FUEL MANAGEMENT COST IS 21.18% OR: | \$275,338 | thousands of 2020 dollars |
| NON-NUCLEAR DEMOLITION COST IS 6.19% OR: | \$80,490 | thousands of 2020 dollars |
| TOTAL LOW-LEVEL RADIOACTIVE WASTE VOLUME BURIED (EXCLUDING GTCC): | 167,763 | Cubic Feet |
| TOTAL GREATER THAN CLASS C RADWASTE VOLUME GENERATED: | 1,773 | Cubic Feet |
| TOTAL SCRAP METAL REMOVED: | 42,406 | Tons |
| TOTAL CRAFT LABOR REQUIREMENTS: | 947,658 | Man-hours |

End Notes:
n/a - indicates that this activity not charged as decommissioning expense
a - indicates that this activity performed by decommissioning staff
0 - indicates that this value is less than 0.5 but is non-zero
A cell containing " - " indicates a zero value

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Decommissioning Cost Analysis***

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APPENDIX H

DETAILED COST ANALYSIS

SCENARIO 6: SAFSTOR with 60 Year DFS

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| Prairie Island Nuclear Generating Plant, Unit 2 | H-12 |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table H-1
Prairie Island SAFSTOR Unit 1
SAFSTOR Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|--|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|---------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| PERIOD 1a - Shutdown through Transition | | | | | | | | | | | | | | | | | | | | | | |
| Period 1a Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| 1a.1.1 | SAFSTOR site characterization survey | - | - | - | - | - | - | 415 | 124 | 539 | 539 | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.2 | Prepare preliminary decommissioning cost | - | - | - | - | - | - | 167 | 25 | 192 | 192 | - | - | - | - | - | - | - | - | - | - | 1,300 |
| 1a.1.3 | Notification of Cessation of Operations | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.4 | Remove fuel & source material | - | - | - | - | - | - | - | - | n/a | - | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.5 | Notification of Permanent Defueling | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.6 | Deactivate plant systems & process waste | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.7 | Prepare and submit PSDAR | - | - | - | - | - | - | 257 | 39 | 296 | 296 | - | - | - | - | - | - | - | - | - | - | 2,000 |
| 1a.1.8 | Review plant dwgs & specs. | - | - | - | - | - | - | 167 | 25 | 192 | 192 | - | - | - | - | - | - | - | - | - | - | 1,300 |
| 1a.1.9 | Perform detailed rad survey | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.10 | Estimate by-product inventory | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | - | 1,000 |
| 1a.1.11 | End product description | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | - | 1,000 |
| 1a.1.12 | Detailed by-product inventory | - | - | - | - | - | - | 193 | 29 | 222 | 222 | - | - | - | - | - | - | - | - | - | - | 1,500 |
| 1a.1.13 | Define major work sequence | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | - | 1,000 |
| 1a.1.14 | Perform SER and EA | - | - | - | - | - | - | 398 | 60 | 458 | 458 | - | - | - | - | - | - | - | - | - | - | 3,100 |
| 1a.1.15 | Perform Site-Specific Cost Study | - | - | - | - | - | - | 643 | 96 | 739 | 739 | - | - | - | - | - | - | - | - | - | - | 5,000 |
| Activity Specifications | | | | | | | | | | | | | | | | | | | | | | |
| 1a.1.16.1 | Prepare plant and facilities for SAFSTOR | - | - | - | - | - | - | 632 | 95 | 727 | 727 | - | - | - | - | - | - | - | - | - | - | 4,920 |
| 1a.1.16.2 | Plant systems | - | - | - | - | - | - | 536 | 80 | 616 | 616 | - | - | - | - | - | - | - | - | - | - | 4,167 |
| 1a.1.16.3 | Plant structures and buildings | - | - | - | - | - | - | 401 | 60 | 461 | 461 | - | - | - | - | - | - | - | - | - | - | 3,120 |
| 1a.1.16.4 | Waste management | - | - | - | - | - | - | 257 | 39 | 296 | 296 | - | - | - | - | - | - | - | - | - | - | 2,000 |
| 1a.1.16.5 | Facility and site dormancy | - | - | - | - | - | - | 257 | 39 | 296 | 296 | - | - | - | - | - | - | - | - | - | - | 2,000 |
| 1a.1.16 | Total | - | - | - | - | - | - | 2,083 | 312 | 2,395 | 2,395 | - | - | - | - | - | - | - | - | - | - | 16,207 |
| Detailed Work Procedures | | | | | | | | | | | | | | | | | | | | | | |
| 1a.1.17.1 | Plant systems | - | - | - | - | - | - | 152 | 23 | 175 | 175 | - | - | - | - | - | - | - | - | - | - | 1,183 |
| 1a.1.17.2 | Facility closeout & dormancy | - | - | - | - | - | - | 154 | 23 | 177 | 177 | - | - | - | - | - | - | - | - | - | - | 1,200 |
| 1a.1.17 | Total | - | - | - | - | - | - | 306 | 46 | 352 | 352 | - | - | - | - | - | - | - | - | - | - | 2,383 |
| 1a.1.18 | Procure vacuum drying system | - | - | - | - | - | - | 13 | 2 | 15 | 15 | - | - | - | - | - | - | - | - | - | - | 100 |
| 1a.1.19 | Drain/de-energize non-cont. systems | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.20 | Drain & dry NSSS | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.21 | Drain/de-energize contaminated systems | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.22 | Decon/secure contaminated systems | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1 | Subtotal Period 1a Activity Costs | - | - | - | - | - | - | 5,027 | 816 | 5,844 | 5,844 | - | - | - | - | - | - | - | - | - | - | 35,890 |
| Period 1a Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 1a.3.1 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 1,249 | - | 1,249 | - | 1,249 | - | - | - | - | - | - | - | - | - | - |
| 1a.3 | Subtotal Period 1a Collateral Costs | - | - | - | - | - | - | 1,249 | - | 1,249 | - | 1,249 | - | - | - | - | - | - | - | - | - | - |
| Period 1a Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 1a.4.1 | Insurance | - | - | - | - | - | - | 1,660 | 166 | 1,826 | 1,826 | - | - | - | - | - | - | - | - | - | - | - |
| 1a.4.2 | Property taxes | - | - | - | - | - | - | 3,623 | 362 | 3,985 | 3,985 | - | - | - | - | - | - | - | - | - | - | - |
| 1a.4.3 | Health physics supplies | - | 614 | - | - | - | - | - | 153 | 767 | 767 | - | - | - | - | - | - | - | - | - | - | - |
| 1a.4.4 | Heavy equipment rental | - | 753 | - | - | - | - | - | 113 | 866 | 866 | - | - | - | - | - | - | - | - | - | - | - |
| 1a.4.5 | Disposal of DAW generated | - | - | 12 | 5 | - | 50 | - | 14 | 82 | 82 | - | - | - | 610 | - | - | - | - | 12,190 | 20 | - |
| 1a.4.6 | Plant energy budget | - | - | - | - | - | - | 1,621 | 243 | 1,864 | 1,864 | - | - | - | - | - | - | - | - | - | - | - |
| 1a.4.7 | NRC Fees | - | - | - | - | - | - | 892 | 89 | 981 | 981 | - | - | - | - | - | - | - | - | - | - | - |
| 1a.4.8 | Emergency Planning Fees | - | - | - | - | - | - | 2,174 | 217 | 2,392 | - | 2,392 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.9 | Fixed Overhead | - | - | - | - | - | - | 1,440 | 216 | 1,656 | 1,656 | - | - | - | - | - | - | - | - | - | - | - |
| 1a.4.10 | Spent Fuel Pool O&M | - | - | - | - | - | - | 422 | 63 | 486 | - | 486 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.11 | ISFSI Operating Costs | - | - | - | - | - | - | 56 | 8 | 64 | - | 64 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.12 | Railroad Track Maintenance | - | - | - | - | - | - | 63 | 9 | 72 | 72 | - | - | - | - | - | - | - | - | - | - | - |
| 1a.4.13 | Security Staff Cost | - | - | - | - | - | - | 8,328 | 1,249 | 9,577 | 9,577 | - | - | - | - | - | - | - | - | - | - | 122,720 |
| 1a.4.14 | Utility Staff Cost | - | - | - | - | - | - | 26,931 | 4,040 | 30,971 | 30,971 | - | - | - | - | - | - | - | - | - | - | 422,240 |
| 1a.4 | Subtotal Period 1a Period-Dependent Costs | - | 1,367 | 12 | 5 | - | 50 | 47,211 | 6,945 | 55,590 | 52,648 | 2,942 | - | - | 610 | - | - | - | - | 12,190 | 20 | 544,960 |
| 1a.0 | TOTAL PERIOD 1a COST | - | 1,367 | 12 | 5 | - | 50 | 53,487 | 7,761 | 62,683 | 58,492 | 4,191 | - | - | 610 | - | - | - | - | 12,190 | 20 | 580,850 |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table H-1
Prairie Island SAFSTOR Unit 1
SAFSTOR Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|--|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|---------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| PERIOD 1b - SAFSTOR Limited DECON Activities | | | | | | | | | | | | | | | | | | | | | | |
| Period 1b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Decontamination of Site Buildings | | | | | | | | | | | | | | | | | | | | | | |
| 1b.1.1.1 | Reactor | 1,199 | - | - | - | - | - | - | 599 | 1,798 | 1,798 | - | - | - | - | - | - | - | - | - | 17,003 | - |
| 1b.1.1 | Totals | 1,199 | - | - | - | - | - | - | 599 | 1,798 | 1,798 | - | - | - | - | - | - | - | - | - | 17,003 | - |
| 1b.1 | Subtotal Period 1b Activity Costs | 1,199 | - | - | - | - | - | - | 599 | 1,798 | 1,798 | - | - | - | - | - | - | - | - | - | 17,003 | - |
| Period 1b Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 1b.2.1 | Spent Fuel Pool Isolation | - | - | - | - | - | - | 12,675 | 1,901 | 14,576 | 14,576 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.2 | Subtotal Period 1b Additional Costs | - | - | - | - | - | - | 12,675 | 1,901 | 14,576 | 14,576 | - | - | - | - | - | - | - | - | - | - | - |
| Period 1b Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 1b.3.1 | Decon equipment | 1,055 | - | - | - | - | - | - | 158 | 1,213 | 1,213 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.3.2 | Process decommissioning water waste | 79 | - | 52 | 94 | - | 212 | - | 112 | 549 | 549 | - | - | - | 487 | - | - | - | - | 29,193 | 95 | - |
| 1b.3.4 | Small tool allowance | - | 20 | - | - | - | - | - | 3 | 23 | 23 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.3.5 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 311 | - | 311 | - | 311 | - | - | - | - | - | - | - | - | - | - |
| 1b.3 | Subtotal Period 1b Collateral Costs | 1,134 | 20 | 52 | 94 | - | 212 | 311 | 273 | 2,097 | 1,785 | 311 | - | - | 487 | - | - | - | - | 29,193 | 95 | - |
| Period 1b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 1b.4.1 | Decon supplies | 449 | - | - | - | - | - | - | 112 | 561 | 561 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.2 | Insurance | - | - | - | - | - | - | 414 | 41 | 455 | 455 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.3 | Property taxes | - | - | - | - | - | - | 903 | 90 | 994 | 994 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.4 | Health physics supplies | - | 250 | - | - | - | - | - | 63 | 313 | 313 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.5 | Heavy equipment rental | - | 188 | - | - | - | - | - | 28 | 216 | 216 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.6 | Disposal of DAW generated | - | - | 6 | 3 | - | 27 | - | 8 | 43 | 43 | - | - | - | 324 | - | - | - | - | 6,486 | 11 | - |
| 1b.4.7 | Plant energy budget | - | - | - | - | - | - | 404 | 61 | 465 | 465 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.8 | NRC Fees | - | - | - | - | - | - | 161 | 16 | 177 | 177 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.9 | Emergency Planning Fees | - | - | - | - | - | - | 542 | 54 | 596 | - | 596 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.10 | Fixed Overhead | - | - | - | - | - | - | 359 | 54 | 413 | 413 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.11 | Spent Fuel Pool O&M | - | - | - | - | - | - | 105 | 16 | 121 | - | 121 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.12 | ISFSI Operating Costs | - | - | - | - | - | - | 14 | 2 | 16 | - | 16 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.13 | Railroad Track Maintenance | - | - | - | - | - | - | 16 | 2 | 18 | 18 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.14 | Security Staff Cost | - | - | - | - | - | - | 2,076 | 311 | 2,388 | 2,388 | - | - | - | - | - | - | - | - | - | - | 30,596 |
| 1b.4.15 | Utility Staff Cost | - | - | - | - | - | - | 6,714 | 1,007 | 7,722 | 7,722 | - | - | - | - | - | - | - | - | - | - | 105,271 |
| 1b.4 | Subtotal Period 1b Period-Dependent Costs | 449 | 438 | 6 | 3 | - | 27 | 11,709 | 1,866 | 14,498 | 13,764 | 733 | - | - | 324 | - | - | - | - | 6,486 | 11 | 135,867 |
| 1b.0 | TOTAL PERIOD 1b COST | 2,781 | 458 | 59 | 97 | - | 239 | 24,696 | 4,640 | 32,969 | 31,924 | 1,045 | - | - | 811 | - | - | - | - | 35,678 | 17,108 | 135,867 |
| PERIOD 1c - Preparations for SAFSTOR Dormancy | | | | | | | | | | | | | | | | | | | | | | |
| Period 1c Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| 1c.1.1 | Prepare support equipment for storage | - | 527 | - | - | - | - | - | 79 | 606 | 606 | - | - | - | - | - | - | - | - | - | 3,000 | - |
| 1c.1.2 | Install containment pressure equal. lines | - | 54 | - | - | - | - | - | 8 | 62 | 62 | - | - | - | - | - | - | - | - | - | 700 | - |
| 1c.1.3 | Interim survey prior to dormancy | - | - | - | - | - | - | 733 | 220 | 953 | 953 | - | - | - | - | - | - | - | - | - | 12,801 | - |
| 1c.1.4 | Secure building accesses | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - | - |
| 1c.1.5 | Prepare & submit interim report | - | - | - | - | - | - | 75 | 11 | 86 | 86 | - | - | - | - | - | - | - | - | - | - | 583 |
| 1c.1 | Subtotal Period 1c Activity Costs | - | 581 | - | - | - | - | 808 | 318 | 1,707 | 1,707 | - | - | - | - | - | - | - | - | - | 16,501 | 583 |
| Period 1c Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 1c.3.1 | Process decommissioning water waste | 91 | - | 60 | 109 | - | 245 | - | 129 | 634 | 634 | - | - | - | 561 | - | - | - | - | 33,685 | 109 | - |
| 1c.3.3 | Small tool allowance | - | 5 | - | - | - | - | - | 1 | 6 | 6 | - | - | - | - | - | - | - | - | - | - | - |
| 1c.3.4 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 163 | 25 | 188 | - | 188 | - | - | - | - | - | - | - | - | - | - |
| 1c.3.5 | Retention and Severance | - | - | - | - | - | - | 1,032 | 155 | 1,187 | 1,187 | - | - | - | - | - | - | - | - | - | - | - |
| 1c.3.6 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 311 | - | 311 | - | 311 | - | - | - | - | - | - | - | - | - | - |
| 1c.3 | Subtotal Period 1c Collateral Costs | 91 | 5 | 60 | 109 | - | 245 | 1,507 | 309 | 2,325 | 1,826 | 499 | - | - | 561 | - | - | - | - | 33,685 | 109 | - |
| Period 1c Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 1c.4.1 | Insurance | - | - | - | - | - | - | 414 | 41 | 455 | 455 | - | - | - | - | - | - | - | - | - | - | - |
| 1c.4.2 | Property taxes | - | - | - | - | - | - | 903 | 90 | 994 | 994 | - | - | - | - | - | - | - | - | - | - | - |
| 1c.4.3 | Health physics supplies | - | 248 | - | - | - | - | - | 62 | 309 | 309 | - | - | - | - | - | - | - | - | - | - | - |
| 1c.4.4 | Heavy equipment rental | - | 188 | - | - | - | - | - | 28 | 216 | 216 | - | - | - | - | - | - | - | - | - | - | - |
| 1c.4.5 | Disposal of DAW generated | - | - | 3 | 1 | - | 13 | - | 4 | 20 | 20 | - | - | - | 152 | - | - | - | - | 3,039 | 5 | - |
| 1c.4.6 | Plant energy budget | - | - | - | - | - | - | 404 | 61 | 465 | 465 | - | - | - | - | - | - | - | - | - | - | - |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table H-1
Prairie Island SAFSTOR Unit 1
SAFSTOR Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|---|--------------|--------------|-----------------|-----------------|---------------------------|---------------------|---------------|-------------------|----------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| Period 1c Period-Dependent Costs (continued) | | | | | | | | | | | | | | | | | | | | | |
| 1c.4.7 | NRC Fees | - | - | - | - | - | - | 161 | 16 | 177 | 177 | - | - | - | - | - | - | - | - | - | - |
| 1c.4.8 | Emergency Planning Fees | - | - | - | - | - | - | 542 | 54 | 596 | - | 596 | - | - | - | - | - | - | - | - | - |
| 1c.4.9 | Fixed Overhead | - | - | - | - | - | - | 359 | 54 | 413 | 413 | - | - | - | - | - | - | - | - | - | - |
| 1c.4.10 | Spent Fuel Pool O&M | - | - | - | - | - | - | 105 | 16 | 121 | - | 121 | - | - | - | - | - | - | - | - | - |
| 1c.4.11 | ISFSI Operating Costs | - | - | - | - | - | - | 14 | 2 | 16 | - | 16 | - | - | - | - | - | - | - | - | - |
| 1c.4.12 | Railroad Track Maintenance | - | - | - | - | - | - | 16 | 2 | 18 | 18 | - | - | - | - | - | - | - | - | - | - |
| 1c.4.13 | Security Staff Cost | - | - | - | - | - | - | 2,076 | 311 | 2,388 | 2,388 | - | - | - | - | - | - | - | - | - | 30,596 |
| 1c.4.14 | Utility Staff Cost | - | - | - | - | - | - | 6,714 | 1,007 | 7,722 | 7,722 | - | - | - | - | - | - | - | - | - | 105,271 |
| 1c.4 | Subtotal Period 1c Period-Dependent Costs | - | 435 | 3 | 1 | - | 13 | 11,709 | 1,749 | 13,910 | 13,177 | 733 | - | - | 152 | - | - | - | 3,039 | 5 | 135,867 |
| 1c.0 | TOTAL PERIOD 1c COST | 91 | 1,021 | 63 | 110 | - | 257 | 14,024 | 2,376 | 17,943 | 16,710 | 1,233 | - | - | 713 | - | - | - | 36,724 | 16,615 | 136,450 |
| PERIOD 1 TOTALS | | 2,873 | 2,846 | 134 | 212 | - | 546 | 92,207 | 14,777 | 113,594 | 107,126 | 6,468 | - | - | 2,134 | - | - | - | 84,593 | 33,743 | 853,167 |
| PERIOD 2a - SAFSTOR Dormancy with Wet Spent Fuel Storage | | | | | | | | | | | | | | | | | | | | | |
| Period 2a Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| 2a.1.1 | Quarterly Inspection | - | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - |
| 2a.1.2 | Semi-annual environmental survey | - | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - |
| 2a.1.3 | Prepare reports | - | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - |
| 2a.1.4 | Bituminous roof replacement | - | - | - | - | - | - | 54 | 8 | 62 | 62 | - | - | - | - | - | - | - | - | - | - |
| 2a.1.5 | Maintenance supplies | - | - | - | - | - | - | 520 | 130 | 650 | 650 | - | - | - | - | - | - | - | - | - | - |
| 2a.1 | Subtotal Period 2a Activity Costs | - | - | - | - | - | - | 574 | 138 | 712 | 712 | - | - | - | - | - | - | - | - | - | - |
| Period 2a Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 2a.2.1 | Security Modifications | - | - | - | - | - | - | 4,348 | 652 | 5,000 | 5,000 | - | - | - | - | - | - | - | - | - | - |
| 2a.2 | Subtotal Period 2a Additional Costs | - | - | - | - | - | - | 4,348 | 652 | 5,000 | 5,000 | - | - | - | - | - | - | - | - | - | - |
| Period 2a Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 2a.3.1 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 59,836 | 8,975 | 68,812 | - | 68,812 | - | - | - | - | - | - | - | - | - |
| 2a.3.2 | Retention and Severance | - | - | - | - | - | - | 22,434 | 3,365 | 25,799 | 25,799 | - | - | - | - | - | - | - | - | - | - |
| 2a.3.3 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 4,654 | - | 4,654 | - | 4,654 | - | - | - | - | - | - | - | - | - |
| 2a.3 | Subtotal Period 2a Collateral Costs | - | - | - | - | - | - | 86,924 | 12,341 | 99,265 | 25,799 | 73,466 | - | - | - | - | - | - | - | - | - |
| Period 2a Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 2a.4.1 | Insurance | - | - | - | - | - | - | 1,804 | 180 | 1,985 | 1,985 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.2 | Property taxes | - | - | - | - | - | - | 13,489 | 1,349 | 14,838 | 14,838 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.3 | Health physics supplies | - | 801 | - | - | - | - | - | 200 | 1,001 | 1,001 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.4 | Disposal of DAW generated | - | - | 14 | 6 | - | 59 | - | 17 | 96 | 96 | - | - | 714 | - | - | - | - | 14,273 | 23 | - |
| 2a.4.5 | Plant energy budget | - | - | - | - | - | - | 1,208 | 181 | 1,389 | 1,389 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.6 | NRC Fees | - | - | - | - | - | - | 908 | 91 | 999 | 999 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.7 | Emergency Planning Fees | - | - | - | - | - | - | 6,924 | 692 | 7,616 | - | 7,616 | - | - | - | - | - | - | - | - | - |
| 2a.4.8 | Fixed Overhead | - | - | - | - | - | - | 4,432 | 665 | 5,097 | 5,097 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.9 | Spent Fuel Pool O&M | - | - | - | - | - | - | 1,573 | 236 | 1,809 | - | 1,809 | - | - | - | - | - | - | - | - | - |
| 2a.4.10 | ISFSI Operating Costs | - | - | - | - | - | - | 209 | 31 | 240 | - | 240 | - | - | - | - | - | - | - | - | - |
| 2a.4.11 | Railroad Track Maintenance | - | - | - | - | - | - | 462 | 69 | 531 | - | 531 | - | - | - | - | - | - | - | - | - |
| 2a.4.12 | Security Staff Cost | - | - | - | - | - | - | 29,334 | 4,400 | 33,734 | 24,289 | 9,446 | - | - | - | - | - | - | - | - | 431,215 |
| 2a.4.13 | Utility Staff Cost | - | - | - | - | - | - | 3,645 | 547 | 4,192 | 3,517 | 675 | - | - | - | - | - | - | - | - | 58,126 |
| 2a.4 | Subtotal Period 2a Period-Dependent Costs | - | 801 | 14 | 6 | - | 59 | 63,988 | 8,659 | 73,527 | 53,741 | 19,786 | - | - | 714 | - | - | - | 14,273 | 23 | 489,341 |
| 2a.0 | TOTAL PERIOD 2a COST | - | 801 | 14 | 6 | - | 59 | 155,834 | 21,790 | 178,504 | 85,251 | 93,252 | - | - | 714 | - | - | - | 14,273 | 23 | 489,341 |
| PERIOD 2b - SAFSTOR Dormancy with Dry Spent Fuel Storage | | | | | | | | | | | | | | | | | | | | | |
| Period 2b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| 2b.1.1 | Quarterly Inspection | - | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - |
| 2b.1.2 | Semi-annual environmental survey | - | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - |
| 2b.1.3 | Prepare reports | - | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - |
| 2b.1.4 | Bituminous roof replacement | - | - | - | - | - | - | 567 | 85 | 652 | 652 | - | - | - | - | - | - | - | - | - | - |
| 2b.1.5 | Maintenance supplies | - | - | - | - | - | - | 5,471 | 1,368 | 6,839 | 6,839 | - | - | - | - | - | - | - | - | - | - |
| 2b.1 | Subtotal Period 2b Activity Costs | - | - | - | - | - | - | 6,038 | 1,453 | 7,491 | 7,491 | - | - | - | - | - | - | - | - | - | - |
| Period 2b Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 2b.3.1 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 18,218 | 2,733 | 20,951 | - | 20,951 | - | - | - | - | - | - | - | - | - |
| 2b.3.2 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 48,970 | - | 48,970 | - | 48,970 | - | - | - | - | - | - | - | - | - |
| 2b.3 | Subtotal Period 2b Collateral Costs | - | - | - | - | - | - | 67,188 | 2,733 | 69,921 | - | 69,921 | - | - | - | - | - | - | - | - | - |

**Prairie Island Nuclear Generating Plant
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**Table H-1
Prairie Island SAFSTOR Unit 1
SAFSTOR Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|--|--|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|-----------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| Period 2b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 2b.4.1 | Insurance | - | - | - | - | - | - | 18,984 | 1,898 | 20,882 | 20,882 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.2 | Property taxes | - | - | - | - | - | - | 141,925 | 14,192 | 156,117 | 156,117 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.3 | Health physics supplies | - | 4,453 | - | - | - | - | - | 1,113 | 5,566 | 5,566 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.4 | Disposal of DAW generated | - | - | 80 | 33 | - | 334 | - | 96 | 543 | 543 | - | - | - | 4,049 | - | - | - | - | 80,989 | 132 | - |
| 2b.4.5 | Plant energy budget | - | - | - | - | - | - | 6,356 | 953 | 7,309 | 7,309 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.6 | NRC Fees | - | - | - | - | - | - | 8,917 | 892 | 9,809 | 9,809 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.7 | Emergency Planning Fees | - | - | - | - | - | - | 2,906 | 291 | 3,197 | - | 3,197 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.8 | Fixed Overhead | - | - | - | - | - | - | 6,388 | 958 | 7,346 | 7,346 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.9 | ISFSI Operating Costs | - | - | - | - | - | - | 2,194 | 329 | 2,523 | - | 2,523 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.10 | Railroad Track Maintenance | - | - | - | - | - | - | 2,451 | 368 | 2,819 | 2,819 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.11 | Security Staff Cost | - | - | - | - | - | - | 109,414 | 16,412 | 125,826 | 27,682 | 98,145 | - | - | - | - | - | - | - | - | - | 1,467,751 |
| 2b.4.12 | Utility Staff Cost | - | - | - | - | - | - | 53,539 | 8,031 | 61,570 | 38,666 | 22,904 | - | - | - | - | - | - | - | - | - | 815,417 |
| 2b.4 | Subtotal Period 2b Period-Dependent Costs | - | 4,453 | 80 | 33 | - | 334 | 353,073 | 45,534 | 403,506 | 276,738 | 126,768 | - | - | 4,049 | - | - | - | - | 80,989 | 132 | 2,283,168 |
| 2b.0 | TOTAL PERIOD 2b COST | - | 4,453 | 80 | 33 | - | 334 | 426,299 | 49,719 | 480,918 | 284,229 | 196,689 | - | - | 4,049 | - | - | - | - | 80,989 | 132 | 2,283,168 |
| PERIOD 2c - SAFSTOR Dormancy without Spent Fuel Storage | | | | | | | | | | | | | | | | | | | | | | |
| Period 2c Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| 2c.1.1 | Quarterly Inspection | - | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 2c.1.2 | Semi-annual environmental survey | - | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 2c.1.3 | Prepare reports | - | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 2c.1.4 | Bituminous roof replacement | - | - | - | - | - | - | 137 | 21 | 157 | 157 | - | - | - | - | - | - | - | - | - | - | - |
| 2c.1.5 | Maintenance supplies | - | - | - | - | - | - | 1,321 | 330 | 1,652 | 1,652 | - | - | - | - | - | - | - | - | - | - | - |
| 2c.1 | Subtotal Period 2c Activity Costs | - | - | - | - | - | - | 1,458 | 351 | 1,809 | 1,809 | - | - | - | - | - | - | - | - | - | - | - |
| Period 2c Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 2c.4.1 | Insurance | - | - | - | - | - | - | 2,645 | 265 | 2,910 | 2,910 | - | - | - | - | - | - | - | - | - | - | - |
| 2c.4.2 | Property taxes | - | - | - | - | - | - | 21,986 | 2,199 | 24,185 | 24,185 | - | - | - | - | - | - | - | - | - | - | - |
| 2c.4.3 | Health physics supplies | - | 1,064 | - | - | - | - | - | 266 | 1,330 | 1,330 | - | - | - | - | - | - | - | - | - | - | - |
| 2c.4.4 | Disposal of DAW generated | - | - | 19 | 8 | - | 79 | - | 23 | 129 | 129 | - | - | - | 964 | - | - | - | - | 19,276 | 31 | - |
| 2c.4.5 | Plant energy budget | - | - | - | - | - | - | 1,535 | 230 | 1,765 | 1,765 | - | - | - | - | - | - | - | - | - | - | - |
| 2c.4.6 | NRC Fees | - | - | - | - | - | - | 1,943 | 194 | 2,137 | 2,137 | - | - | - | - | - | - | - | - | - | - | - |
| 2c.4.7 | Fixed Overhead | - | - | - | - | - | - | 1,543 | 231 | 1,774 | 1,774 | - | - | - | - | - | - | - | - | - | - | - |
| 2c.4.8 | Railroad Track Maintenance | - | - | - | - | - | - | 592 | 89 | 681 | 681 | - | - | - | - | - | - | - | - | - | - | - |
| 2c.4.9 | Security Staff Cost | - | - | - | - | - | - | 22,641 | 3,396 | 26,037 | 26,037 | - | - | - | - | - | - | - | - | - | - | 295,417 |
| 2c.4.10 | Utility Staff Cost | - | - | - | - | - | - | 10,979 | 1,647 | 12,626 | 12,626 | - | - | - | - | - | - | - | - | - | - | 172,327 |
| 2c.4 | Subtotal Period 2c Period-Dependent Costs | - | 1,064 | 19 | 8 | - | 79 | 63,865 | 8,540 | 73,575 | 73,575 | - | - | - | 964 | - | - | - | - | 19,276 | 31 | 467,744 |
| 2c.0 | TOTAL PERIOD 2c COST | - | 1,064 | 19 | 8 | - | 79 | 65,323 | 8,891 | 75,384 | 75,384 | - | - | - | 964 | - | - | - | - | 19,276 | 31 | 467,744 |
| PERIOD 2 TOTALS | | | | | | | | | | | | | | | | | | | | | | |
| - | - | - | 6,318 | 114 | 46 | - | 472 | 647,456 | 80,400 | 734,806 | 444,864 | 289,942 | - | - | 5,727 | - | - | - | - | 114,538 | 187 | 3,240,253 |
| PERIOD 3a - Reactivate Site Following SAFSTOR Dormancy | | | | | | | | | | | | | | | | | | | | | | |
| Period 3a Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| 3a.1.1 | Prepare preliminary decommissioning cost | - | - | - | - | - | - | 167 | 25 | 192 | 192 | - | - | - | - | - | - | - | - | - | - | 1,300 |
| 3a.1.2 | Review plant dwgs & specs. | - | - | - | - | - | - | 591 | 89 | 680 | 680 | - | - | - | - | - | - | - | - | - | - | 4,600 |
| 3a.1.3 | Perform detailed rad survey | - | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 3a.1.4 | End product description | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | - | 1,000 |
| 3a.1.5 | Detailed by-product inventory | - | - | - | - | - | - | 167 | 25 | 192 | 192 | - | - | - | - | - | - | - | - | - | - | 1,300 |
| 3a.1.6 | Define major work sequence | - | - | - | - | - | - | 964 | 145 | 1,108 | 1,108 | - | - | - | - | - | - | - | - | - | - | 7,500 |
| 3a.1.7 | Perform SER and EA | - | - | - | - | - | - | 398 | 60 | 458 | 458 | - | - | - | - | - | - | - | - | - | - | 3,100 |
| 3a.1.8 | Prepare/submit Defueled Technical Specifications | - | - | - | - | - | - | 964 | 145 | 1,108 | 1,108 | - | - | - | - | - | - | - | - | - | - | 7,500 |
| 3a.1.9 | Perform Site-Specific Cost Study | - | - | - | - | - | - | 643 | 96 | 739 | 739 | - | - | - | - | - | - | - | - | - | - | 5,000 |
| 3a.1.10 | Prepare/submit Irradiated Fuel Management Plan | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | - | 1,000 |
| Activity Specifications | | | | | | | | | | | | | | | | | | | | | | |
| 3a.1.11.1 | Re-activate plant & temporary facilities | - | - | - | - | - | - | 947 | 142 | 1,089 | 980 | - | 109 | - | - | - | - | - | - | - | - | 7,370 |
| 3a.1.11.2 | Plant systems | - | - | - | - | - | - | 536 | 80 | 616 | 554 | - | 62 | - | - | - | - | - | - | - | - | 4,167 |
| 3a.1.11.3 | Reactor internals | - | - | - | - | - | - | 912 | 137 | 1,049 | 1,049 | - | - | - | - | - | - | - | - | - | - | 7,100 |
| 3a.1.11.4 | Reactor vessel | - | - | - | - | - | - | 835 | 125 | 961 | 961 | - | - | - | - | - | - | - | - | - | - | 6,500 |
| 3a.1.11.5 | Biological shield | - | - | - | - | - | - | 64 | 10 | 74 | 74 | - | - | - | - | - | - | - | - | - | - | 500 |
| 3a.1.11.6 | Steam generators | - | - | - | - | - | - | 401 | 60 | 461 | 461 | - | - | - | - | - | - | - | - | - | - | 3,120 |
| 3a.1.11.7 | Reinforced concrete | - | - | - | - | - | - | 206 | 31 | 236 | 118 | - | 118 | - | - | - | - | - | - | - | - | 1,600 |
| 3a.1.11.8 | Main Turbine | - | - | - | - | - | - | 51 | 8 | 59 | - | - | 59 | - | - | - | - | - | - | - | - | 400 |
| 3a.1.11.9 | Main Condensers | - | - | - | - | - | - | 51 | 8 | 59 | - | - | 59 | - | - | - | - | - | - | - | - | 400 |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table H-1
Prairie Island SAFSTOR Unit 1
SAFSTOR Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|---------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| Activity Specifications (continued) | | | | | | | | | | | | | | | | | | | | | | |
| 3a.1.11.10 | Plant structures & buildings | - | - | - | - | - | - | 401 | 60 | 461 | 231 | - | 231 | - | - | - | - | - | - | - | - | 3,120 |
| 3a.1.11.11 | Waste management | - | - | - | - | - | - | 591 | 89 | 680 | 680 | - | - | - | - | - | - | - | - | - | - | 4,600 |
| 3a.1.11.12 | Facility & site closeout | - | - | - | - | - | - | 116 | 17 | 133 | 67 | - | 67 | - | - | - | - | - | - | - | - | 900 |
| 3a.1.11 | Total | - | - | - | - | - | - | 5,112 | 767 | 5,879 | 5,175 | - | 704 | - | - | - | - | - | - | - | - | 39,777 |
| Planning & Site Preparations | | | | | | | | | | | | | | | | | | | | | | |
| 3a.1.12 | Prepare dismantling sequence | - | - | - | - | - | - | 308 | 46 | 355 | 355 | - | - | - | - | - | - | - | - | - | - | 2,400 |
| 3a.1.13 | Plant prep. & temp. svces | - | - | - | - | - | - | 3,500 | 525 | 4,025 | 4,025 | - | - | - | - | - | - | - | - | - | - | - |
| 3a.1.14 | Design water clean-up system | - | - | - | - | - | - | 180 | 27 | 207 | 207 | - | - | - | - | - | - | - | - | - | - | 1,400 |
| 3a.1.15 | Rigging/Cont. Cntrl Envlps/tooling/etc. | - | - | - | - | - | - | 2,400 | 360 | 2,760 | 2,760 | - | - | - | - | - | - | - | - | - | - | - |
| 3a.1.16 | Procure casks/liners & containers | - | - | - | - | - | - | 158 | 24 | 182 | 182 | - | - | - | - | - | - | - | - | - | - | 1,230 |
| 3a.1 | Subtotal Period 3a Activity Costs | - | - | - | - | - | - | 15,810 | 2,371 | 18,181 | 17,477 | - | 704 | - | - | - | - | - | - | - | - | 77,107 |
| Period 3a Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3a.2.1 | Site Characterization | - | - | - | - | - | - | 3,520 | 1,056 | 4,576 | 4,576 | - | - | - | - | - | - | - | - | - | - | 21,020 |
| 3a.2.2 | Mixed/Hazardous Waste | - | - | 353 | 94 | 178 | - | - | 76 | 702 | 702 | - | - | 6,132 | - | - | - | - | - | 351,977 | 2,348 | - |
| 3a.2.3 | Asbestos Abatement | - | 2,526 | 3 | 150 | - | 1,369 | - | 996 | 5,044 | 5,044 | - | - | - | 12,843 | - | - | - | - | 166,959 | 20,907 | - |
| 3a.2 | Subtotal Period 3a Additional Costs | - | 2,526 | 356 | 244 | 178 | 1,369 | 3,520 | 2,129 | 10,321 | 10,321 | - | - | 6,132 | 12,843 | - | - | - | - | 518,936 | 44,275 | 8,332 |
| Period 3a Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3a.3.1 | Small tool allowance | - | 34 | - | - | - | - | - | 5 | 39 | 39 | - | - | - | - | - | - | - | - | - | - | - |
| 3a.3 | Subtotal Period 3a Collateral Costs | - | 34 | - | - | - | - | - | 5 | 39 | 39 | - | - | - | - | - | - | - | - | - | - | - |
| Period 3a Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3a.4.1 | Insurance | - | - | - | - | - | - | 279 | 28 | 307 | 307 | - | - | - | - | - | - | - | - | - | - | - |
| 3a.4.2 | Property taxes | - | - | - | - | - | - | 2,320 | 232 | 2,553 | 2,553 | - | - | - | - | - | - | - | - | - | - | - |
| 3a.4.3 | Health physics supplies | - | 669 | - | - | - | - | - | 167 | 836 | 836 | - | - | - | - | - | - | - | - | - | - | - |
| 3a.4.4 | Heavy equipment rental | - | 753 | - | - | - | - | - | 113 | 866 | 866 | - | - | - | - | - | - | - | - | - | - | - |
| 3a.4.5 | Disposal of DAW generated | - | - | 10 | 4 | - | 42 | - | 12 | 69 | 69 | - | - | - | 514 | - | - | - | - | 10,287 | 17 | - |
| 3a.4.6 | Plant energy budget | - | - | - | - | - | - | 1,621 | 243 | 1,864 | 1,864 | - | - | - | - | - | - | - | - | - | - | - |
| 3a.4.7 | NRC Fees | - | - | - | - | - | - | 335 | 33 | 368 | 368 | - | - | - | - | - | - | - | - | - | - | - |
| 3a.4.8 | Fixed Overhead | - | - | - | - | - | - | 1,440 | 216 | 1,656 | 1,656 | - | - | - | - | - | - | - | - | - | - | - |
| 3a.4.9 | Railroad Track Maintenance | - | - | - | - | - | - | 63 | 9 | 72 | 72 | - | - | - | - | - | - | - | - | - | - | - |
| 3a.4.10 | Security Staff Cost | - | - | - | - | - | - | 4,386 | 658 | 5,044 | 5,044 | - | - | - | - | - | - | - | - | - | - | 65,000 |
| 3a.4.11 | Utility Staff Cost | - | - | - | - | - | - | 16,379 | 2,457 | 18,835 | 18,835 | - | - | - | - | - | - | - | - | - | - | 257,920 |
| 3a.4 | Subtotal Period 3a Period-Dependent Costs | - | 1,422 | 10 | 4 | - | 42 | 26,823 | 4,169 | 32,471 | 32,471 | - | - | - | 514 | - | - | - | - | 10,287 | 17 | 322,920 |
| 3a.0 | TOTAL PERIOD 3a COST | - | 3,982 | 366 | 248 | 178 | 1,411 | 46,153 | 8,674 | 61,013 | 60,308 | - | 704 | 6,132 | 13,357 | - | - | - | - | 529,223 | 44,292 | 408,359 |
| PERIOD 3b - Decommissioning Preparations | | | | | | | | | | | | | | | | | | | | | | |
| Period 3b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Detailed Work Procedures | | | | | | | | | | | | | | | | | | | | | | |
| 3b.1.1.1 | Plant systems | - | - | - | - | - | - | 608 | 91 | 700 | 630 | - | 70 | - | - | - | - | - | - | - | - | 4,733 |
| 3b.1.1.2 | Reactor internals | - | - | - | - | - | - | 321 | 48 | 369 | 369 | - | - | - | - | - | - | - | - | - | - | 2,500 |
| 3b.1.1.3 | Remaining buildings | - | - | - | - | - | - | 174 | 26 | 200 | 50 | - | 150 | - | - | - | - | - | - | - | - | 1,350 |
| 3b.1.1.4 | CRD cooling assembly | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | - | 1,000 |
| 3b.1.1.5 | CRD housings & ICI tubes | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | - | 1,000 |
| 3b.1.1.6 | Incore instrumentation | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | - | 1,000 |
| 3b.1.1.7 | Reactor vessel | - | - | - | - | - | - | 467 | 70 | 537 | 537 | - | - | - | - | - | - | - | - | - | - | 3,630 |
| 3b.1.1.8 | Facility closeout | - | - | - | - | - | - | 154 | 23 | 177 | 89 | - | 89 | - | - | - | - | - | - | - | - | 1,200 |
| 3b.1.1.9 | Missile shields | - | - | - | - | - | - | 58 | 9 | 67 | 67 | - | - | - | - | - | - | - | - | - | - | 450 |
| 3b.1.1.10 | Biological shield | - | - | - | - | - | - | 154 | 23 | 177 | 177 | - | - | - | - | - | - | - | - | - | - | 1,200 |
| 3b.1.1.11 | Steam generators | - | - | - | - | - | - | 591 | 89 | 680 | 680 | - | - | - | - | - | - | - | - | - | - | 4,600 |
| 3b.1.1.12 | Reinforced concrete | - | - | - | - | - | - | 129 | 19 | 148 | 74 | - | 74 | - | - | - | - | - | - | - | - | 1,000 |
| 3b.1.1.13 | Main Turbine | - | - | - | - | - | - | 200 | 30 | 231 | - | - | 231 | - | - | - | - | - | - | - | - | 1,560 |
| 3b.1.1.14 | Main Condensers | - | - | - | - | - | - | 200 | 30 | 231 | - | - | 231 | - | - | - | - | - | - | - | - | 1,560 |
| 3b.1.1.15 | Auxiliary building | - | - | - | - | - | - | 351 | 53 | 403 | 363 | - | 40 | - | - | - | - | - | - | - | - | 2,730 |
| 3b.1.1.16 | Reactor building | - | - | - | - | - | - | 351 | 53 | 403 | 363 | - | 40 | - | - | - | - | - | - | - | - | 2,730 |
| 3b.1.1 | Total | - | - | - | - | - | - | 4,144 | 622 | 4,765 | 3,841 | - | 924 | - | - | - | - | - | - | - | - | 32,243 |
| 3b.1 | Subtotal Period 3b Activity Costs | - | - | - | - | - | - | 4,144 | 622 | 4,765 | 3,841 | - | 924 | - | - | - | - | - | - | - | - | 32,243 |
| Period 3b Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3b.3.1 | Decon equipment | 1,055 | - | - | - | - | - | - | 158 | 1,213 | 1,213 | - | - | - | - | - | - | - | - | - | - | - |
| 3b.3.2 | DOC staff relocation expenses | - | - | - | - | - | - | 1,264 | 190 | 1,454 | 1,454 | - | - | - | - | - | - | - | - | - | - | - |
| 3b.3.3 | Pipe cutting equipment | - | 1,200 | - | - | - | - | - | 180 | 1,380 | 1,380 | - | - | - | - | - | - | - | - | - | - | - |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table H-1
Prairie Island SAFSTOR Unit 1
SAFSTOR Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | GTCC Cu. Feet | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|--|---|--------------|--------------|-----------------|-----------------|---------------------------|---------------------|---------------|-------------------|---------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|---|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | | | | | |
| 3b.3 | Subtotal Period 3b Collateral Costs | 1,055 | 1,200 | - | - | - | - | 1,264 | 528 | 4,047 | 4,047 | - | - | - | - | - | - | - | - | - | - | - |
| Period 3b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3b.4.1 | Decon supplies | 38 | - | - | - | - | - | - | 9 | 47 | 47 | - | - | - | - | - | - | - | - | - | - | |
| 3b.4.2 | Insurance | - | - | - | - | - | - | 241 | 24 | 266 | 266 | - | - | - | - | - | - | - | - | - | - | |
| 3b.4.3 | Property taxes | - | - | - | - | - | - | 1,155 | 116 | 1,271 | 1,271 | - | - | - | - | - | - | - | - | - | - | |
| 3b.4.4 | Health physics supplies | - | 295 | - | - | - | - | - | 74 | 369 | 369 | - | - | - | - | - | - | - | - | - | - | |
| 3b.4.5 | Heavy equipment rental | - | 375 | - | - | - | - | - | 56 | 432 | 432 | - | - | - | - | - | - | - | - | - | - | |
| 3b.4.6 | Disposal of DAW generated | - | - | 6 | 2 | - | 24 | - | 7 | 39 | 39 | - | - | - | 290 | - | - | - | 5,802 | 9 | - | |
| 3b.4.7 | Plant energy budget | - | - | - | - | - | - | 808 | 121 | 930 | 930 | - | - | - | - | - | - | - | - | - | - | |
| 3b.4.8 | NRC Fees | - | - | - | - | - | - | 167 | 17 | 183 | 183 | - | - | - | - | - | - | - | - | - | - | |
| 3b.4.9 | Fixed Overhead | - | - | - | - | - | - | 718 | 108 | 826 | 826 | - | - | - | - | - | - | - | - | - | - | |
| 3b.4.10 | Railroad Track Maintenance | - | - | - | - | - | - | 31 | 5 | 36 | 36 | - | - | - | - | - | - | - | - | - | - | |
| 3b.4.11 | Security Staff Cost | - | - | - | - | - | - | 2,187 | 328 | 2,515 | 2,515 | - | - | - | - | - | - | - | - | - | 32,411 | |
| 3b.4.12 | DOC Staff Cost | - | - | - | - | - | - | 5,344 | 802 | 6,146 | 6,146 | - | - | - | - | - | - | - | - | - | 58,080 | |
| 3b.4.13 | Utility Staff Cost | - | - | - | - | - | - | 8,167 | 1,225 | 9,392 | 9,392 | - | - | - | - | - | - | - | - | - | 128,607 | |
| 3b.4 | Subtotal Period 3b Period-Dependent Costs | 38 | 670 | 6 | 2 | - | 24 | 18,820 | 2,891 | 22,450 | 22,450 | - | - | - | 290 | - | - | - | 5,802 | 9 | 219,098 | |
| 3b.0 | TOTAL PERIOD 3b COST | 1,092 | 1,870 | 6 | 2 | - | 24 | 24,227 | 4,040 | 31,262 | 30,338 | - | 924 | - | 290 | - | - | - | 5,802 | 9 | 251,341 | |
| PERIOD 3 TOTALS | | 1,092 | 5,852 | 372 | 251 | 178 | 1,435 | 70,380 | 12,715 | 92,275 | 90,647 | - | 1,628 | 6,132 | 13,647 | - | - | - | 535,025 | 44,301 | 659,700 | |
| PERIOD 4a - Large Component Removal | | | | | | | | | | | | | | | | | | | | | | |
| Period 4a Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Nuclear Steam Supply System Removal | | | | | | | | | | | | | | | | | | | | | | |
| 4a.1.1.1 | Reactor Coolant Piping | 11 | 42 | 10 | 11 | 66 | 94 | - | 52 | 285 | 285 | - | - | 240 | 254 | - | - | - | 33,680 | 778 | - | |
| 4a.1.1.2 | Pressurizer Relief Tank | 5 | 19 | 6 | 7 | 44 | 62 | - | 31 | 174 | 174 | - | - | 160 | 169 | - | - | - | 22,441 | 352 | - | |
| 4a.1.1.3 | Reactor Coolant Pumps & Motors | 13 | 60 | 46 | 85 | - | 463 | - | 155 | 822 | 822 | - | - | - | 2,332 | - | - | - | 295,800 | 1,226 | 80 | |
| 4a.1.1.4 | Pressurizer | - | 77 | 382 | 91 | - | 776 | - | 265 | 1,591 | 1,591 | - | - | - | 2,196 | - | - | - | 158,199 | 1,346 | 750 | |
| 4a.1.1.5 | Steam Generators | - | 3,307 | 1,690 | 1,743 | 2,409 | 3,885 | - | 2,590 | 15,625 | 15,625 | - | - | 18,672 | 10,990 | - | - | - | 1,581,180 | 10,253 | 2,250 | |
| 4a.1.1.6 | CRDMs/ICIs/Service Structure Removal | 63 | 248 | 205 | 44 | 326 | 454 | - | 283 | 1,623 | 1,623 | - | - | 2,138 | 2,146 | - | - | - | 165,025 | 4,449 | - | |
| 4a.1.1.7 | Reactor Vessel Internals | 53 | 4,650 | 11,331 | 828 | - | 8,610 | 278 | 10,900 | 36,649 | 36,649 | - | - | - | 1,174 | - | 742 | - | 167,605 | 22,373 | 1,053 | |
| 4a.1.1.8 | Vessel & Internals GTCC Disposal | - | - | - | - | - | 8,680 | - | 1,302 | 9,982 | 9,982 | - | - | - | - | - | - | 1,773 | 344,823 | - | - | |
| 4a.1.1.9 | Reactor Vessel | - | 5,835 | 1,653 | 442 | - | 3,268 | 278 | 6,576 | 18,053 | 18,053 | - | - | - | 9,245 | - | - | - | 579,324 | 22,373 | 1,053 | |
| 4a.1.1 | Totals | 146 | 14,237 | 15,324 | 3,250 | 2,845 | 26,293 | 556 | 22,154 | 84,804 | 84,804 | - | - | 21,210 | 28,505 | - | 742 | 1,773 | 3,348,078 | 63,151 | 5,187 | |
| Removal of Major Equipment | | | | | | | | | | | | | | | | | | | | | | |
| 4a.1.2 | Main Turbine/Generator | - | 292 | 116 | 35 | 555 | - | - | 173 | 1,170 | 1,170 | - | - | 2,243 | - | - | - | - | 134,601 | 4,116 | - | |
| 4a.1.3 | Main Condensers | - | 2,510 | 79 | 33 | 742 | - | - | 752 | 4,115 | 4,115 | - | - | 4,000 | - | - | - | - | 180,000 | 34,978 | - | |
| Cascading Costs from Clean Building Demolition | | | | | | | | | | | | | | | | | | | | | | |
| 4a.1.4.1 | Reactor | - | 794 | - | - | - | - | - | 119 | 913 | 913 | - | - | - | - | - | - | - | - | - | 7,589 | |
| 4a.1.4 | Totals | - | 794 | - | - | - | - | - | 119 | 913 | 913 | - | - | - | - | - | - | - | - | - | 7,589 | |
| Disposal of Plant Systems | | | | | | | | | | | | | | | | | | | | | | |
| 4a.1.5.1 | Air Removal | - | 31 | - | - | - | - | - | 5 | 36 | - | - | 36 | - | - | - | - | - | - | - | 452 | |
| 4a.1.5.2 | Auxiliary Feedwater | - | 46 | - | - | - | - | - | 7 | 53 | - | - | 53 | - | - | - | - | - | - | - | 670 | |
| 4a.1.5.3 | Auxiliary Feedwater - RCA | - | 47 | 0 | 2 | 36 | - | - | 17 | 102 | 102 | - | - | 215 | - | - | - | - | 8,722 | 601 | - | |
| 4a.1.5.4 | Bleed Steam | - | 90 | - | - | - | - | - | 14 | 104 | - | - | 104 | - | - | - | - | - | - | - | 1,335 | |
| 4a.1.5.5 | Caustic Addition - RCA | - | 38 | 0 | 2 | 39 | - | - | 16 | 95 | 95 | - | - | 233 | - | - | - | - | 9,453 | 444 | - | |
| 4a.1.5.6 | Chemical Feed | - | 20 | - | - | - | - | - | 3 | 23 | - | - | 23 | - | - | - | - | - | - | - | 304 | |
| 4a.1.5.7 | Chemical Feed - RCA | - | 1 | 0 | 0 | 1 | - | - | 0 | 3 | 3 | - | - | 6 | - | - | - | - | 243 | 12 | - | |
| 4a.1.5.8 | Circulating Water | - | 42 | - | - | - | - | - | 6 | 49 | - | - | 49 | - | - | - | - | - | - | - | 619 | |
| 4a.1.5.9 | Condensate | - | 474 | - | - | - | - | - | 71 | 545 | - | - | 545 | - | - | - | - | - | - | - | 6,837 | |
| 4a.1.5.10 | Condensate Polishing | - | 235 | - | - | - | - | - | 35 | 271 | - | - | 271 | - | - | - | - | - | - | - | 3,420 | |
| 4a.1.5.11 | Condensate Polishing - RCA | - | 183 | 4 | 15 | 348 | - | - | 101 | 651 | 651 | - | - | 2,078 | - | - | - | - | 84,395 | 2,329 | - | |
| 4a.1.5.12 | Electro-hydraulic | - | 9 | - | - | - | - | - | 1 | 10 | - | - | 10 | - | - | - | - | - | - | - | 127 | |
| 4a.1.5.13 | Feedwater | - | 153 | - | - | - | - | - | 23 | 175 | - | - | 175 | - | - | - | - | - | - | - | 2,215 | |
| 4a.1.5.14 | Feedwater - RCA | - | 195 | 7 | 24 | 537 | - | - | 133 | 895 | 895 | - | - | 3,208 | - | - | - | - | 130,294 | 2,651 | - | |
| 4a.1.5.15 | Gland Seal | - | 34 | - | - | - | - | - | 5 | 39 | - | - | 39 | - | - | - | - | - | - | - | 505 | |
| 4a.1.5.16 | Heater Drain | - | 400 | - | - | - | - | - | 60 | 460 | - | - | 460 | - | - | - | - | - | - | - | 5,881 | |
| 4a.1.5.17 | Internal Circ Water & CDSR | - | 27 | - | - | - | - | - | 4 | 31 | - | - | 31 | - | - | - | - | - | - | - | 389 | |
| 4a.1.5.18 | Main Gen/Exciter/Transformer | - | 0 | - | - | - | - | - | 0 | 0 | - | - | 0 | - | - | - | - | - | - | - | 5 | |
| 4a.1.5.19 | Main Steam | - | 115 | - | - | - | - | - | 17 | 133 | - | - | 133 | - | - | - | - | - | - | - | 1,690 | |
| 4a.1.5.20 | Main Steam - RCA | - | 366 | 10 | 37 | 844 | - | - | 225 | 1,482 | 1,482 | - | - | 5,044 | - | - | - | - | 204,825 | 4,956 | - | |
| 4a.1.5.21 | Steam Generator Blowdown | - | 434 | 22 | 29 | 340 | 234 | - | 224 | 1,282 | 1,282 | - | - | 2,031 | 686 | - | - | - | 126,640 | 5,974 | - | |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table H-1
Prairie Island SAFSTOR Unit 1
SAFSTOR Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|---------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| Disposal of Plant Systems (continued) | | | | | | | | | | | | | | | | | | | | | | |
| 4a.1.5.22 | Steam Generators | - | 5 | - | - | - | - | - | 1 | 6 | - | - | 6 | - | - | - | - | - | - | - | 75 | - |
| 4a.1.5.23 | Turbine & Moisture Separators | - | 386 | - | - | - | - | - | 58 | 444 | - | - | 444 | - | - | - | - | - | - | - | 5,609 | - |
| 4a.1.5.24 | Turbine Oil Purification | - | 70 | - | - | - | - | - | 11 | 81 | - | - | 81 | - | - | - | - | - | - | - | 1,003 | - |
| 4a.1.5 | Totals | - | 3,401 | 44 | 108 | 2,144 | 234 | - | 1,037 | 6,967 | 4,510 | - | 2,458 | 12,815 | 686 | - | - | - | - | 564,572 | 48,101 | - |
| 4a.1.6 | Scaffolding in support of decommissioning | - | 909 | 3 | 1 | 26 | 4 | - | 233 | 1,176 | 1,176 | - | - | 138 | 12 | - | - | - | - | 6,985 | 6,020 | - |
| 4a.1 | Subtotal Period 4a Activity Costs | 146 | 22,144 | 15,566 | 3,426 | 6,311 | 26,530 | 556 | 24,467 | 99,147 | 96,689 | - | 2,458 | 40,406 | 29,203 | - | 742 | 1,773 | 4,234,235 | 163,954 | 5,187 | - |
| Period 4a Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 4a.2.1 | Retired RPV upper internals package | - | 128 | 166 | 58 | - | 1,583 | - | 944 | 2,879 | 2,879 | - | - | - | 572 | 125 | - | - | - | 49,800 | 1,667 | 67 |
| 4a.2 | Subtotal Period 4a Additional Costs | - | 128 | 166 | 58 | - | 1,583 | - | 944 | 2,879 | 2,879 | - | - | - | 572 | 125 | - | - | - | 49,800 | 1,667 | 67 |
| Period 4a Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 4a.3.1 | Process decommissioning water waste | 2 | - | 4 | 8 | - | 17 | - | 7 | 38 | 38 | - | - | - | 39 | - | - | - | - | 2,337 | 8 | - |
| 4a.3.3 | Small tool allowance | - | 213 | - | - | - | - | - | 32 | 245 | 220 | - | 24 | - | - | - | - | - | - | - | - | - |
| 4a.3 | Subtotal Period 4a Collateral Costs | 2 | 213 | 4 | 8 | - | 17 | - | 39 | 283 | 258 | - | 24 | - | 39 | - | - | - | - | 2,337 | 8 | - |
| Period 4a Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 4a.4.1 | Decon supplies | 100 | - | - | - | - | - | - | 25 | 125 | 125 | - | - | - | - | - | - | - | - | - | - | - |
| 4a.4.2 | Insurance | - | - | - | - | - | - | 643 | 64 | 708 | 708 | - | - | - | - | - | - | - | - | - | - | - |
| 4a.4.3 | Property taxes | - | - | - | - | - | - | 2,715 | 272 | 2,987 | 2,987 | - | - | - | - | - | - | - | - | - | - | - |
| 4a.4.4 | Health physics supplies | - | 1,743 | - | - | - | - | - | 436 | 2,179 | 2,179 | - | - | - | - | - | - | - | - | - | - | - |
| 4a.4.5 | Heavy equipment rental | - | 3,325 | - | - | - | - | - | 499 | 3,824 | 3,824 | - | - | - | - | - | - | - | - | - | - | - |
| 4a.4.6 | Disposal of DAW generated | - | - | 59 | 24 | - | 245 | - | 71 | 398 | 398 | - | - | - | 2,971 | - | - | - | - | 59,418 | 97 | - |
| 4a.4.7 | Plant energy budget | - | - | - | - | - | - | 2,047 | 307 | 2,354 | 2,354 | - | - | - | - | - | - | - | - | - | - | - |
| 4a.4.8 | NRC Fees | - | - | - | - | - | - | 643 | 64 | 707 | 707 | - | - | - | - | - | - | - | - | - | - | - |
| 4a.4.9 | Fixed Overhead | - | - | - | - | - | - | 1,581 | 237 | 1,818 | 1,818 | - | - | - | - | - | - | - | - | - | - | - |
| 4a.4.10 | Liquid Radwaste Processing Equipment/Services | - | - | - | - | - | - | 565 | 85 | 649 | 649 | - | - | - | - | - | - | - | - | - | - | - |
| 4a.4.11 | Railroad Track Maintenance | - | - | - | - | - | - | 83 | 12 | 96 | 96 | - | - | - | - | - | - | - | - | - | - | - |
| 4a.4.12 | Remedial Actions Surveys | - | - | - | - | - | - | 1,489 | 223 | 1,712 | 1,712 | - | - | - | - | - | - | - | - | - | - | - |
| 4a.4.13 | Security Staff Cost | - | - | - | - | - | - | 5,167 | 775 | 5,943 | 5,943 | - | - | - | - | - | - | - | - | - | - | 76,832 |
| 4a.4.14 | DOC Staff Cost | - | - | - | - | - | - | 17,190 | 2,579 | 19,769 | 19,769 | - | - | - | - | - | - | - | - | - | - | 189,964 |
| 4a.4.15 | Utility Staff Cost | - | - | - | - | - | - | 21,633 | 3,245 | 24,877 | 24,877 | - | - | - | - | - | - | - | - | - | - | 340,664 |
| 4a.4 | Subtotal Period 4a Period-Dependent Costs | 100 | 5,068 | 59 | 24 | - | 245 | 53,755 | 8,894 | 68,145 | 68,145 | - | - | - | 2,971 | - | - | - | - | 59,418 | 97 | 607,460 |
| 4a.0 | TOTAL PERIOD 4a COST | 248 | 27,553 | 15,796 | 3,516 | 6,311 | 28,375 | 54,311 | 34,343 | 170,454 | 167,972 | - | 2,482 | 40,406 | 32,785 | 125 | 742 | 1,773 | 4,345,791 | 165,725 | 612,713 | - |
| PERIOD 4b - Site Decontamination | | | | | | | | | | | | | | | | | | | | | | |
| Period 4b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| 4b.1.1 | Remove spent fuel racks | 314 | 35 | 86 | 41 | - | 703 | - | 356 | 1,535 | 1,535 | - | - | - | 2,092 | - | - | - | - | 132,919 | 576 | - |
| Disposal of Plant Systems | | | | | | | | | | | | | | | | | | | | | | |
| 4b.1.2.1 | Aux Bldg Normal Ventilation | - | 2 | 0 | 0 | 1 | - | - | 1 | 3 | 3 | - | - | 3 | - | - | - | - | - | 140 | 26 | - |
| 4b.1.2.3 | Buildings Maintenance | - | 5 | - | - | - | - | - | 1 | 5 | - | - | 5 | - | - | - | - | - | - | - | 65 | - |
| 4b.1.2.4 | Chemical & Volume Control | - | 1,263 | 89 | 90 | 753 | 973 | - | 694 | 3,861 | 3,861 | - | - | 4,498 | 2,846 | - | - | - | - | 366,565 | 17,235 | - |
| 4b.1.2.5 | Component Cooling - RCA | - | 858 | 25 | 91 | 2,079 | - | - | 543 | 3,597 | 3,597 | - | - | 12,427 | - | - | - | - | - | 504,675 | 11,242 | - |
| 4b.1.2.6 | Containment Cooling | - | 74 | - | - | - | - | - | 11 | 85 | - | - | 85 | - | - | - | - | - | - | - | 1,086 | - |
| 4b.1.2.7 | Containment Cooling - RCA | - | 304 | 7 | 25 | 569 | - | - | 166 | 1,070 | 1,070 | - | - | 3,400 | - | - | - | - | - | 138,090 | 3,971 | - |
| 4b.1.2.8 | Containment Hydrogen Control - RCA | - | 30 | 0 | 1 | 18 | - | - | 10 | 59 | 59 | - | - | 105 | - | - | - | - | - | 4,278 | 401 | - |
| 4b.1.2.9 | Containment Spray - RCA | - | 93 | 2 | 6 | 145 | - | - | 46 | 293 | 293 | - | - | 868 | - | - | - | - | - | 35,249 | 1,217 | - |
| 4b.1.2.10 | Containment Ventilation | - | 229 | 24 | 51 | 828 | 248 | - | 254 | 1,635 | 1,635 | - | - | 4,951 | 737 | - | - | - | - | 247,952 | 3,278 | - |
| 4b.1.2.11 | Cooling Water | - | 163 | - | - | - | - | - | 24 | 187 | - | - | 187 | - | - | - | - | - | - | - | 2,396 | - |
| 4b.1.2.12 | Cooling Water - RCA | - | 658 | 16 | 57 | 1,293 | - | - | 368 | 2,392 | 2,392 | - | - | 7,728 | - | - | - | - | - | 313,832 | 8,594 | - |
| 4b.1.2.13 | D1 Emergency Diesel | - | 50 | - | - | - | - | - | 8 | 58 | - | - | 58 | - | - | - | - | - | - | - | 730 | - |
| 4b.1.2.14 | D2 Emergency Diesel | - | 36 | - | - | - | - | - | 5 | 41 | - | - | 41 | - | - | - | - | - | - | - | 522 | - |
| 4b.1.2.15 | Diesel Rooms Ventilation | - | 9 | - | - | - | - | - | 1 | 11 | - | - | 11 | - | - | - | - | - | - | - | 135 | - |
| 4b.1.2.16 | Electrical - Clean | - | 1,905 | - | - | - | - | - | 286 | 2,191 | - | - | 2,191 | - | - | - | - | - | - | - | 26,981 | - |
| 4b.1.2.17 | Electrical - Contaminated | - | 553 | 7 | 20 | 423 | 32 | - | 213 | 1,248 | 1,248 | - | - | 2,527 | 95 | - | - | - | - | 108,690 | 7,488 | - |
| 4b.1.2.18 | Electrical - Contaminated - Fuel Pool | - | 137 | 2 | 5 | 103 | 8 | - | 53 | 307 | 307 | - | - | 615 | 23 | - | - | - | - | 26,449 | 1,857 | - |
| 4b.1.2.19 | Electrical - Decontaminated | - | 3,787 | 48 | 173 | 3,940 | - | - | 1,569 | 9,518 | 9,518 | - | - | 23,551 | - | - | - | - | - | 956,401 | 49,378 | - |
| 4b.1.2.20 | Electrical - Decontaminated - Fuel Pool | - | 947 | 12 | 43 | 986 | - | - | 392 | 2,380 | 2,380 | - | - | 5,893 | - | - | - | - | - | 239,327 | 12,340 | - |
| 4b.1.2.21 | Fuel Handling | - | 108 | 6 | 11 | 152 | 73 | - | 70 | 421 | 421 | - | - | 908 | 218 | - | - | - | - | 50,723 | 1,595 | - |
| 4b.1.2.22 | Fuel Oil | - | 121 | - | - | - | - | - | 18 | 140 | - | - | 140 | - | - | - | - | - | - | - | 1,697 | - |
| 4b.1.2.23 | HVAC - Clean | - | 120 | - | - | - | - | - | 18 | 138 | - | - | 138 | - | - | - | - | - | - | - | 1,891 | - |
| 4b.1.2.24 | HVAC - Contaminated | - | 337 | 9 | 26 | 546 | 41 | - | 181 | 1,141 | 1,141 | - | - | 3,261 | 123 | - | - | - | - | 140,257 | 4,335 | - |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table H-1
Prairie Island SAFSTOR Unit 1
SAFSTOR Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|---------------------------------------|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|---------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| Disposal of Plant Systems (continued) | | | | | | | | | | | | | | | | | | | | | | |
| 4b.1.2.25 | HVAC - Contaminated - Fuel Pool | - | 145 | 4 | 11 | 234 | 18 | - | 78 | 489 | 489 | - | - | 1,398 | 53 | - | - | - | - | 60,110 | 1,858 | - |
| 4b.1.2.26 | Incore Instrumentation | - | 25 | 1 | 2 | 10 | 19 | - | 13 | 70 | 70 | - | - | 60 | 57 | - | - | - | - | 6,058 | 382 | - |
| 4b.1.2.27 | Misc Drains & Vents | - | 212 | 15 | 13 | 65 | 176 | - | 110 | 592 | 592 | - | - | 390 | 514 | - | - | - | - | 49,062 | 2,764 | - |
| 4b.1.2.28 | Reactor Coolant | - | 283 | 21 | 18 | 58 | 265 | - | 150 | 796 | 796 | - | - | 344 | 777 | - | - | - | - | 64,085 | 3,865 | - |
| 4b.1.2.29 | Reactor Hot Sampling | - | 125 | 12 | 7 | 11 | 118 | - | 65 | 339 | 339 | - | - | 66 | 342 | - | - | - | - | 25,063 | 1,611 | - |
| 4b.1.2.30 | Reactor Makeup | - | 73 | - | - | - | - | - | 11 | 84 | - | - | 84 | - | - | - | - | - | - | - | 1,042 | - |
| 4b.1.2.31 | Reactor Vessel | - | 19 | 1 | 0 | 4 | 5 | - | 7 | 36 | 36 | - | - | 26 | 14 | - | - | - | - | 2,000 | 260 | - |
| 4b.1.2.32 | Residual Heat Removal | - | 378 | 85 | 86 | 484 | 1,105 | - | 465 | 2,603 | 2,603 | - | - | 2,895 | 3,252 | - | - | - | - | 326,425 | 5,374 | - |
| 4b.1.2.33 | Safeguards Chilled Water | - | 18 | - | - | - | - | - | 3 | 20 | - | - | 20 | - | - | - | - | - | - | - | 259 | - |
| 4b.1.2.34 | Safeguards Chilled Water - RCA | - | 85 | 1 | 4 | 83 | - | - | 34 | 207 | 207 | - | - | 495 | - | - | - | - | - | 20,100 | 1,019 | - |
| 4b.1.2.35 | Safety Injection | - | 809 | 42 | 73 | 1,136 | 393 | - | 486 | 2,939 | 2,939 | - | - | 6,788 | 1,156 | - | - | - | - | 349,908 | 11,276 | - |
| 4b.1.2.36 | Sampling | - | 54 | 4 | 3 | 10 | 37 | - | 25 | 133 | 133 | - | - | 59 | 107 | - | - | - | - | 9,420 | 731 | - |
| 4b.1.2.37 | Shield Bldg Ventilation | - | 125 | 14 | 26 | 360 | 165 | - | 132 | 821 | 821 | - | - | 2,152 | 491 | - | - | - | - | 118,583 | 1,811 | - |
| 4b.1.2.38 | Spent Fuel Pool Cooling | - | 324 | 34 | 32 | 135 | 450 | - | 222 | 1,198 | 1,198 | - | - | 806 | 1,325 | - | - | - | - | 117,816 | 4,400 | - |
| 4b.1.2.39 | Station & Instrument Air | - | 20 | - | - | - | - | - | 3 | 23 | - | - | 23 | - | - | - | - | - | - | - | 300 | - |
| 4b.1.2.40 | Station & Instrument Air - RCA | - | 81 | 1 | 2 | 56 | - | - | 29 | 169 | 169 | - | - | 332 | - | - | - | - | - | 13,496 | 1,053 | - |
| 4b.1.2.41 | Station & Instrument Air - RCA Fuel Pool | - | 20 | 0 | 1 | 14 | - | - | 7 | 42 | 42 | - | - | 83 | - | - | - | - | - | 3,374 | 263 | - |
| 4b.1.2.42 | Turbine Bldg Traps & Drains | - | 50 | - | - | - | - | - | 8 | 58 | - | - | 58 | - | - | - | - | - | - | - | 767 | - |
| 4b.1.2.43 | Unit Coolers | - | 42 | - | - | - | - | - | 6 | 49 | - | - | 49 | - | - | - | - | - | - | - | 611 | - |
| 4b.1.2.44 | Unit Coolers - RCA | - | 55 | 0 | 2 | 39 | - | - | 20 | 115 | 115 | - | - | 230 | - | - | - | - | - | 9,348 | 683 | - |
| 4b.1.2 | Totals | - | 14,735 | 481 | 883 | 14,533 | 4,126 | - | 6,807 | 41,565 | 38,474 | - | 3,091 | 86,861 | 12,129 | - | - | - | - | 4,307,475 | 198,796 | - |
| 4b.1.3 | Scaffolding in support of decommissioning | - | 1,363 | 4 | 2 | 38 | 6 | - | 349 | 1,763 | 1,763 | - | - | 207 | 18 | - | - | - | - | 10,477 | 9,030 | - |
| Decontamination of Site Buildings | | | | | | | | | | | | | | | | | | | | | | |
| 4b.1.4.1 | Reactor | 1,096 | 2,527 | 240 | 1,236 | 373 | 7,080 | - | 3,215 | 15,766 | 15,766 | - | - | 2,230 | 67,325 | - | - | - | - | 3,286,372 | 45,729 | - |
| 4b.1.4.2 | Backwash Waste Receiving Tank | - | 25 | 3 | 17 | - | 97 | - | 33 | 175 | 175 | - | - | - | 929 | - | - | - | - | 43,896 | 266 | - |
| 4b.1.4 | Totals | 1,096 | 2,552 | 243 | 1,253 | 373 | 7,177 | - | 3,248 | 15,941 | 15,941 | - | - | 2,230 | 68,254 | - | - | - | - | 3,330,268 | 45,995 | - |
| 4b.1.5 | Prepare/submit License Termination Plan | - | - | - | - | - | - | 526 | 79 | 605 | 605 | - | - | - | - | - | - | - | - | - | - | 4,096 |
| 4b.1.6 | Receive NRC approval of termination plan | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - | - |
| 4b.1 | Subtotal Period 4b Activity Costs | 1,410 | 18,685 | 814 | 2,179 | 14,945 | 12,012 | 526 | 10,839 | 61,410 | 58,319 | - | 3,091 | 89,298 | 82,494 | - | - | - | - | 7,781,139 | 254,398 | 4,096 |
| Period 4b Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 4b.2.1 | License Termination Survey Planning | - | - | - | - | - | - | 1,037 | 311 | 1,348 | 1,348 | - | - | - | - | - | - | - | - | - | - | 6,240 |
| 4b.2.2 | Excavation of Underground Services | - | 1,175 | - | - | - | - | 225 | 328 | 1,728 | 1,728 | - | - | - | - | - | - | - | - | - | 7,411 | - |
| 4b.2.3 | Operational Equipment | - | - | 11 | 36 | 606 | - | - | 97 | 751 | 751 | - | - | 5,880 | - | - | - | - | - | 147,000 | 16 | - |
| 4b.2.4 | License Termination ISFSI | - | 24 | 81 | 435 | - | 2,532 | 1,375 | 1,112 | 5,560 | 5,560 | - | - | - | 9,355 | - | - | - | - | 1,123,457 | 3,762 | 5,460 |
| 4b.2 | Subtotal Period 4b Additional Costs | - | 1,199 | 93 | 471 | 606 | 2,532 | 2,638 | 1,848 | 9,387 | 9,387 | - | - | 5,880 | 9,355 | - | - | - | - | 1,270,457 | 11,189 | 11,700 |
| Period 4b Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 4b.3.1 | Process decommissioning water waste | 5 | - | 9 | 16 | - | 37 | - | 15 | 83 | 83 | - | - | - | 85 | - | - | - | - | 5,092 | 17 | - |
| 4b.3.2 | Process decommissioning chemical flush waste | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 4b.3.3 | Small tool allowance | - | 307 | - | - | - | - | - | 46 | 353 | 353 | - | - | - | - | - | - | - | - | - | - | - |
| 4b.3.4 | Decommissioning Equipment Disposition | - | - | 130 | 67 | 1,112 | 178 | - | 234 | 1,722 | 1,722 | - | - | 6,000 | 529 | - | - | - | - | 303,608 | 147 | - |
| 4b.3 | Subtotal Period 4b Collateral Costs | 5 | 307 | 139 | 84 | 1,112 | 215 | - | 296 | 2,158 | 2,158 | - | - | 6,000 | 614 | - | - | - | - | 308,700 | 163 | - |
| Period 4b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 4b.4.1 | Decon supplies | 564 | - | - | - | - | - | - | 141 | 705 | 705 | - | - | - | - | - | - | - | - | - | - | - |
| 4b.4.2 | Insurance | - | - | - | - | - | 862 | - | 86 | 949 | 949 | - | - | - | - | - | - | - | - | - | - | - |
| 4b.4.3 | Property taxes | - | - | - | - | - | - | 3,505 | 351 | 3,856 | 3,856 | - | - | - | - | - | - | - | - | - | - | - |
| 4b.4.4 | Health physics supplies | - | 2,456 | - | - | - | - | - | 614 | 3,070 | 3,070 | - | - | - | - | - | - | - | - | - | - | - |
| 4b.4.5 | Heavy equipment rental | - | 4,577 | - | - | - | - | - | 687 | 5,263 | 5,263 | - | - | - | - | - | - | - | - | - | - | - |
| 4b.4.6 | Disposal of DAW generated | - | - | 77 | 31 | - | 322 | - | 93 | 523 | 523 | - | - | - | 3,905 | - | - | - | - | 78,097 | 127 | - |
| 4b.4.7 | Plant energy budget | - | - | - | - | - | - | 2,165 | 325 | 2,490 | 2,490 | - | - | - | - | - | - | - | - | - | - | - |
| 4b.4.8 | NRC Fees | - | - | - | - | - | 862 | - | 86 | 948 | 948 | - | - | - | - | - | - | - | - | - | - | - |
| 4b.4.9 | Fixed Overhead | - | - | - | - | - | 2,118 | - | 318 | 2,436 | 2,436 | - | - | - | - | - | - | - | - | - | - | - |
| 4b.4.10 | Liquid Radwaste Processing Equipment/Services | - | - | - | - | - | 757 | - | 113 | 870 | 870 | - | - | - | - | - | - | - | - | - | - | - |
| 4b.4.11 | Railroad Track Maintenance | - | - | - | - | - | 111 | - | 17 | 128 | 128 | - | - | - | - | - | - | - | - | - | - | - |
| 4b.4.12 | Remedial Actions Surveys | - | - | - | - | - | 1,995 | - | 299 | 2,294 | 2,294 | - | - | - | - | - | - | - | - | - | - | - |
| 4b.4.13 | Security Staff Cost | - | - | - | - | - | 1,202 | - | 180 | 1,383 | 1,383 | - | - | - | - | - | - | - | - | - | - | 20,373 |
| 4b.4.14 | DOC Staff Cost | - | - | - | - | - | 15,039 | - | 2,256 | 17,294 | 17,294 | - | - | - | - | - | - | - | - | - | - | 174,093 |
| 4b.4.15 | Utility Staff Cost | - | - | - | - | - | 18,793 | - | 2,819 | 21,612 | 21,612 | - | - | - | - | - | - | - | - | - | - | 311,145 |
| 4b.4 | Subtotal Period 4b Period-Dependent Costs | 564 | 7,033 | 77 | 31 | - | 322 | 47,410 | 8,384 | 63,822 | 63,822 | - | - | - | 3,905 | - | - | - | - | 78,097 | 127 | 505,611 |
| 4b.0 | TOTAL PERIOD 4b COST | 1,979 | 27,224 | 1,123 | 2,765 | 16,663 | 15,081 | 50,574 | 21,367 | 136,776 | 133,686 | - | 3,091 | 101,178 | 96,368 | - | - | - | - | 9,438,392 | 265,878 | 521,407 |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table H-1
Prairie Island SAFSTOR Unit 1
SAFSTOR Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|---|---|--------------|---------------|-----------------|-----------------|---------------------------|---------------------|----------------|-------------------|----------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|---------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| PERIOD 4e - Delay before License Termination | | | | | | | | | | | | | | | | | | | | | | |
| Period 4e Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Period 4e Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 4e.4.2 | Property taxes | - | - | - | - | - | - | 1,476 | 148 | 1,623 | 1,623 | - | - | - | - | - | - | - | - | - | - | - |
| 4e.4.3 | Health physics supplies | - | 87 | - | - | - | - | - | 22 | 109 | 109 | - | - | - | - | - | - | - | - | - | - | |
| 4e.4.4 | Disposal of DAW generated | - | - | 2 | 1 | - | 6 | - | 2 | 11 | 11 | - | - | - | 79 | - | - | - | - | 1,573 | 3 | |
| 4e.4.6 | NRC Fees | - | - | - | - | - | - | 162 | 16 | 178 | 178 | - | - | - | - | - | - | - | - | - | - | |
| 4e.4.7 | Fixed Overhead | - | - | - | - | - | - | 939 | 141 | 1,079 | 1,079 | - | - | - | - | - | - | - | - | - | - | |
| 4e.4.8 | Railroad Track Maintenance | - | - | - | - | - | - | 49 | 7 | 57 | 57 | - | - | - | - | - | - | - | - | - | - | |
| 4e.4.9 | Utility Staff Cost | - | - | - | - | - | - | 696 | 104 | 801 | 801 | - | - | - | - | - | - | - | - | - | 11,488 | |
| 4e.4 | Subtotal Period 4e Period-Dependent Costs | - | 87 | 2 | 1 | - | 6 | 3,322 | 440 | 3,858 | 3,858 | - | - | - | 79 | - | - | - | - | 1,573 | 3 | 11,488 |
| 4e.0 | TOTAL PERIOD 4e COST | - | 87 | 2 | 1 | - | 6 | 3,322 | 440 | 3,858 | 3,858 | - | - | - | 79 | - | - | - | - | 1,573 | 3 | 11,488 |
| PERIOD 4f - License Termination | | | | | | | | | | | | | | | | | | | | | | |
| Period 4f Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| 4f.1.1 | ORISE confirmatory survey | - | - | - | - | - | - | 166 | 50 | 216 | 216 | - | - | - | - | - | - | - | - | - | - | |
| 4f.1.2 | Terminate license | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | |
| 4f.1 | Subtotal Period 4f Activity Costs | - | - | - | - | - | - | 166 | 50 | 216 | 216 | - | - | - | - | - | - | - | - | - | - | |
| Period 4f Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 4f.2.1 | License Termination Survey | - | - | - | - | - | - | 3,199 | 960 | 4,159 | 4,159 | - | - | - | - | - | - | - | - | - | 40,531 | 3,120 |
| 4f.2 | Subtotal Period 4f Additional Costs | - | - | - | - | - | - | 3,199 | 960 | 4,159 | 4,159 | - | - | - | - | - | - | - | - | - | 40,531 | 3,120 |
| Period 4f Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 4f.3.1 | DOC staff relocation expenses | - | - | - | - | - | - | 1,264 | 190 | 1,454 | 1,454 | - | - | - | - | - | - | - | - | - | - | |
| 4f.3 | Subtotal Period 4f Collateral Costs | - | - | - | - | - | - | 1,264 | 190 | 1,454 | 1,454 | - | - | - | - | - | - | - | - | - | - | |
| Period 4f Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 4f.4.2 | Property taxes | - | - | - | - | - | - | 1,335 | 133 | 1,468 | 1,468 | - | - | - | - | - | - | - | - | - | - | |
| 4f.4.3 | Health physics supplies | - | 499 | - | - | - | - | - | 125 | 624 | 624 | - | - | - | - | - | - | - | - | - | - | |
| 4f.4.4 | Disposal of DAW generated | - | - | 7 | 3 | - | 27 | - | 8 | 45 | 45 | - | - | - | 332 | - | - | - | - | 6,649 | 11 | |
| 4f.4.5 | Plant energy budget | - | - | - | - | - | - | 243 | 36 | 279 | 279 | - | - | - | - | - | - | - | - | - | - | |
| 4f.4.6 | NRC Fees | - | - | - | - | - | - | 422 | 42 | 465 | 465 | - | - | - | - | - | - | - | - | - | - | |
| 4f.4.7 | Fixed Overhead | - | - | - | - | - | - | 890 | 133 | 1,023 | 1,023 | - | - | - | - | - | - | - | - | - | - | |
| 4f.4.8 | Railroad Track Maintenance | - | - | - | - | - | - | 47 | 7 | 54 | 54 | - | - | - | - | - | - | - | - | - | - | |
| 4f.4.9 | Security Staff Cost | - | - | - | - | - | - | 805 | 121 | 926 | 926 | - | - | - | - | - | - | - | - | - | 11,668 | |
| 4f.4.10 | DOC Staff Cost | - | - | - | - | - | - | 4,238 | 636 | 4,874 | 4,874 | - | - | - | - | - | - | - | - | - | 46,283 | |
| 4f.4.11 | Utility Staff Cost | - | - | - | - | - | - | 3,772 | 566 | 4,338 | 4,338 | - | - | - | - | - | - | - | - | - | 56,395 | |
| 4f.4 | Subtotal Period 4f Period-Dependent Costs | - | 499 | 7 | 3 | - | 27 | 11,752 | 1,808 | 14,096 | 14,096 | - | - | - | 332 | - | - | - | - | 6,649 | 11 | 114,346 |
| 4f.0 | TOTAL PERIOD 4f COST | - | 499 | 7 | 3 | - | 27 | 16,381 | 3,007 | 19,924 | 19,924 | - | - | - | 332 | - | - | - | - | 6,649 | 40,542 | 117,466 |
| PERIOD 4 TOTALS | | 2,227 | 55,364 | 16,927 | 6,284 | 22,974 | 43,490 | 124,588 | 59,158 | 331,012 | 325,439 | - | 5,573 | 141,584 | 129,564 | 125 | 742 | 1,773 | 13,792,410 | 472,147 | 1,263,075 | |
| PERIOD 5b - Site Restoration | | | | | | | | | | | | | | | | | | | | | | |
| Period 5b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Demolition of Remaining Site Buildings | | | | | | | | | | | | | | | | | | | | | | |
| 5b.1.1.1 | Reactor | - | 4,644 | - | - | - | - | - | 697 | 5,341 | - | - | 5,341 | - | - | - | - | - | - | - | 44,669 | - |
| 5b.1.1.2 | Condensate Storage Tank Foundation | - | 3 | - | - | - | - | - | 0 | 4 | - | - | 4 | - | - | - | - | - | - | - | 16 | - |
| 5b.1.1.3 | Structures below 3' below grade | - | 1,785 | - | - | - | - | - | 268 | 2,052 | - | - | 2,052 | - | - | - | - | - | - | - | 9,238 | - |
| 5b.1.1.4 | Turbine | - | 2,139 | - | - | - | - | - | 321 | 2,460 | - | - | 2,460 | - | - | - | - | - | - | - | 21,985 | - |
| 5b.1.1.5 | Turbine Pedestal | - | 365 | - | - | - | - | - | 55 | 420 | - | - | 420 | - | - | - | - | - | - | - | 1,857 | - |
| 5b.1.1 | Totals | - | 8,936 | - | - | - | - | - | 1,340 | 10,276 | - | - | 10,276 | - | - | - | - | - | - | - | 77,765 | - |
| Site Closeout Activities | | | | | | | | | | | | | | | | | | | | | | |
| 5b.1.2 | Grade & landscape site | - | 448 | - | - | - | - | - | 67 | 515 | - | - | 515 | - | - | - | - | - | - | - | 921 | - |
| 5b.1.3 | Final report to NRC | - | - | - | - | - | - | 200 | 30 | 231 | 231 | - | - | - | - | - | - | - | - | - | - | 1,560 |
| 5b.1 | Subtotal Period 5b Activity Costs | - | 9,384 | - | - | - | - | 200 | 1,438 | 11,022 | 231 | - | 10,792 | - | - | - | - | - | - | - | 78,686 | 1,560 |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table H-1
Prairie Island SAFSTOR Unit 1
SAFSTOR Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|-----------------------------------|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|---------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| Period 5b Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 5b.2.1 | Clean Concrete Disposal | - | 2,242 | - | - | - | - | 5 | 337 | 2,583 | - | - | 2,583 | - | - | - | - | - | - | - | 8,386 | - |
| 5b.2.2 | Intake Structure Cofferdam | - | 623 | - | - | - | - | - | 93 | 716 | - | - | 716 | - | - | - | - | - | - | - | 5,168 | - |
| 5b.2.3 | Construction Debris | - | - | - | - | - | - | 10 | 2 | 12 | - | - | 12 | - | - | - | - | - | - | - | - | - |
| 5b.2.4 | Backfill | - | 3,011 | - | - | - | - | - | 452 | 3,462 | - | - | 3,462 | - | - | - | - | - | - | - | 2,904 | - |
| 5b.2.5 | Demolition and Site Restoration of ISFSI | - | 515 | - | - | - | - | 68 | 87 | 670 | - | - | 670 | - | - | - | - | - | - | - | 2,219 | 80 |
| 5b.2 | Subtotal Period 5b Additional Costs | - | 6,390 | - | - | - | - | 82 | 971 | 7,443 | - | - | 7,443 | - | - | - | - | - | - | - | 18,677 | 80 |
| Period 5b Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 5b.3.1 | Small tool allowance | - | 125 | - | - | - | - | - | 19 | 143 | - | - | 143 | - | - | - | - | - | - | - | - | - |
| 5b.3 | Subtotal Period 5b Collateral Costs | - | 125 | - | - | - | - | - | 19 | 143 | - | - | 143 | - | - | - | - | - | - | - | - | - |
| Period 5b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 5b.4.2 | Property taxes | - | - | - | - | - | - | 3,481 | 348 | 3,829 | - | - | 3,829 | - | - | - | - | - | - | - | - | - |
| 5b.4.3 | Heavy equipment rental | - | 7,144 | - | - | - | - | - | 1,072 | 8,215 | - | - | 8,215 | - | - | - | - | - | - | - | - | - |
| 5b.4.4 | Plant energy budget | - | - | - | - | - | - | 344 | 52 | 395 | - | - | 395 | - | - | - | - | - | - | - | - | - |
| 5b.4.5 | Fixed Overhead | - | - | - | - | - | - | 1,024 | 154 | 1,178 | - | - | 1,178 | - | - | - | - | - | - | - | - | - |
| 5b.4.6 | Railroad Track Maintenance | - | - | - | - | - | - | 133 | 20 | 152 | - | - | 152 | - | - | - | - | - | - | - | - | - |
| 5b.4.7 | Security Staff Cost | - | - | - | - | - | - | 2,055 | 308 | 2,363 | - | - | 2,363 | - | - | - | - | - | - | - | - | 29,221 |
| 5b.4.8 | DOC Staff Cost | - | - | - | - | - | - | 10,921 | 1,638 | 12,559 | - | - | 12,559 | - | - | - | - | - | - | - | - | 116,885 |
| 5b.4.9 | Utility Staff Cost | - | - | - | - | - | - | 3,831 | 575 | 4,406 | - | - | 4,406 | - | - | - | - | - | - | - | - | 57,340 |
| 5b.4 | Subtotal Period 5b Period-Dependent Costs | - | 7,144 | - | - | - | - | 21,789 | 4,166 | 33,099 | - | - | 33,099 | - | - | - | - | - | - | - | - | 203,445 |
| 5b.0 | TOTAL PERIOD 5b COST | - | 23,042 | - | - | - | - | 22,072 | 6,593 | 51,707 | 231 | - | 51,476 | - | - | - | - | - | - | - | 97,363 | 205,085 |
| PERIOD 5 TOTALS | | - | 23,042 | - | - | - | - | 22,072 | 6,593 | 51,707 | 231 | - | 51,476 | - | - | - | - | - | - | - | 97,363 | 205,085 |
| TOTAL COST TO DECOMMISSION | | 6,192 | 93,421 | 17,547 | 6,792 | 23,152 | 45,943 | 956,703 | 173,643 | 1,323,393 | 968,306 | 296,410 | 58,677 | 147,716 | 151,072 | 125 | 742 | 1,773 | 14,526,560 | 647,742 | 6,221,279 | |

| | | |
|--|--------------------|----------------------------------|
| TOTAL COST TO DECOMMISSION WITH 15.1% CONTINGENCY: | \$1,323,393 | thousands of 2020 dollars |
| TOTAL NRC LICENSE TERMINATION COST IS 73.17% OR: | \$968,306 | thousands of 2020 dollars |
| SPENT FUEL MANAGEMENT COST IS 22.4% OR: | \$296,410 | thousands of 2020 dollars |
| NON-NUCLEAR DEMOLITION COST IS 4.43% OR: | \$58,677 | thousands of 2020 dollars |
| TOTAL LOW-LEVEL RADIOACTIVE WASTE VOLUME BURIED (EXCLUDING GTCC): | 151,940 | Cubic Feet |
| TOTAL GREATER THAN CLASS C RADWASTE VOLUME GENERATED: | 1,773 | Cubic Feet |
| TOTAL SCRAP METAL REMOVED: | 33,003 | Tons |
| TOTAL CRAFT LABOR REQUIREMENTS: | 647,742 | Man-hours |

End Notes:
n/a - indicates that this activity not charged as decommissioning expense
a - indicates that this activity performed by decommissioning staff
0 - indicates that this value is less than 0.5 but is non-zero
A cell containing " - " indicates a zero value

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table H-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|--|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|---------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| PERIOD 1a - Shutdown through Transition | | | | | | | | | | | | | | | | | | | | | | |
| Period 1a Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| 1a.1.1 | SAFSTOR site characterization survey | - | - | - | - | - | - | 415 | 124 | 539 | 539 | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.2 | Prepare preliminary decommissioning cost | - | - | - | - | - | - | 71 | 11 | 82 | 82 | - | - | - | - | - | - | - | - | - | - | 556 |
| 1a.1.3 | Notification of Cessation of Operations | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.4 | Remove fuel & source material | - | - | - | - | - | - | - | - | n/a | - | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.5 | Notification of Permanent Defueling | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.6 | Deactivate plant systems & process waste | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.7 | Prepare and submit PSDAR | - | - | - | - | - | - | 110 | 16 | 126 | 126 | - | - | - | - | - | - | - | - | - | - | 855 |
| 1a.1.8 | Review plant dwgs & specs. | - | - | - | - | - | - | 71 | 11 | 82 | 82 | - | - | - | - | - | - | - | - | - | - | 556 |
| 1a.1.9 | Perform detailed rad survey | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.10 | Estimate by-product inventory | - | - | - | - | - | - | 55 | 8 | 63 | 63 | - | - | - | - | - | - | - | - | - | - | 428 |
| 1a.1.11 | End product description | - | - | - | - | - | - | 55 | 8 | 63 | 63 | - | - | - | - | - | - | - | - | - | - | 428 |
| 1a.1.12 | Detailed by-product inventory | - | - | - | - | - | - | 82 | 12 | 95 | 95 | - | - | - | - | - | - | - | - | - | - | 641 |
| 1a.1.13 | Define major work sequence | - | - | - | - | - | - | 55 | 8 | 63 | 63 | - | - | - | - | - | - | - | - | - | - | 428 |
| 1a.1.14 | Perform SER and EA | - | - | - | - | - | - | 170 | 26 | 196 | 196 | - | - | - | - | - | - | - | - | - | - | 1,326 |
| 1a.1.15 | Perform Site-Specific Cost Study | - | - | - | - | - | - | 275 | 41 | 316 | 316 | - | - | - | - | - | - | - | - | - | - | 2,138 |
| Activity Specifications | | | | | | | | | | | | | | | | | | | | | | |
| 1a.1.16.1 | Prepare plant and facilities for SAFSTOR | - | - | - | - | - | - | 270 | 41 | 311 | 311 | - | - | - | - | - | - | - | - | - | - | 2,104 |
| 1a.1.16.2 | Plant systems | - | - | - | - | - | - | 229 | 34 | 263 | 263 | - | - | - | - | - | - | - | - | - | - | 1,782 |
| 1a.1.16.3 | Plant structures and buildings | - | - | - | - | - | - | 171 | 26 | 197 | 197 | - | - | - | - | - | - | - | - | - | - | 1,334 |
| 1a.1.16.4 | Waste management | - | - | - | - | - | - | 110 | 16 | 126 | 126 | - | - | - | - | - | - | - | - | - | - | 855 |
| 1a.1.16.5 | Facility and site dormancy | - | - | - | - | - | - | 110 | 16 | 126 | 126 | - | - | - | - | - | - | - | - | - | - | 855 |
| 1a.1.16 | Total | - | - | - | - | - | - | 891 | 134 | 1,024 | 1,024 | - | - | - | - | - | - | - | - | - | - | 6,930 |
| Detailed Work Procedures | | | | | | | | | | | | | | | | | | | | | | |
| 1a.1.17.1 | Plant systems | - | - | - | - | - | - | 65 | 10 | 75 | 75 | - | - | - | - | - | - | - | - | - | - | 506 |
| 1a.1.17.2 | Facility closeout & dormancy | - | - | - | - | - | - | 66 | 10 | 76 | 76 | - | - | - | - | - | - | - | - | - | - | 513 |
| 1a.1.17 | Total | - | - | - | - | - | - | 131 | 20 | 151 | 151 | - | - | - | - | - | - | - | - | - | - | 1,019 |
| 1a.1.18 | Procure vacuum drying system | - | - | - | - | - | - | 5 | 1 | 6 | 6 | - | - | - | - | - | - | - | - | - | - | 43 |
| 1a.1.19 | Drain/de-energize non-cont. systems | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.20 | Drain & dry NSSS | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.21 | Drain/de-energize contaminated systems | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.22 | Decon/secure contaminated systems | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1 | Subtotal Period 1a Activity Costs | - | - | - | - | - | - | 2,387 | 420 | 2,807 | 2,807 | - | - | - | - | - | - | - | - | - | - | 15,347 |
| Period 1a Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 1a.3.1 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 1,330 | 199 | 1,529 | - | 1,529 | - | - | - | - | - | - | - | - | - | - |
| 1a.3.2 | Retention and Severance | - | - | - | - | - | - | 8,394 | 1,259 | 9,653 | 9,653 | - | - | - | - | - | - | - | - | - | - | - |
| 1a.3.3 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 1,249 | - | 1,249 | - | 1,249 | - | - | - | - | - | - | - | - | - | - |
| 1a.3 | Subtotal Period 1a Collateral Costs | - | - | - | - | - | - | 10,973 | 1,459 | 12,432 | 9,653 | 2,779 | - | - | - | - | - | - | - | - | - | - |
| Period 1a Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 1a.4.1 | Insurance | - | - | - | - | - | - | 1,660 | 166 | 1,826 | 1,826 | - | - | - | - | - | - | - | - | - | - | - |
| 1a.4.2 | Property taxes | - | - | - | - | - | - | 3,623 | 362 | 3,985 | 3,985 | - | - | - | - | - | - | - | - | - | - | - |
| 1a.4.3 | Health physics supplies | - | 604 | - | - | - | - | - | 151 | 755 | 755 | - | - | - | - | - | - | - | - | - | - | - |
| 1a.4.4 | Heavy equipment rental | - | 753 | - | - | - | - | - | 113 | 866 | 866 | - | - | - | - | - | - | - | - | - | - | - |
| 1a.4.5 | Disposal of DAW generated | - | - | 12 | 5 | - | 49 | - | 14 | 80 | 80 | - | - | 597 | - | - | - | - | - | 11,944 | 19 | - |
| 1a.4.6 | Plant energy budget | - | - | - | - | - | - | 1,621 | 243 | 1,864 | 1,864 | - | - | - | - | - | - | - | - | - | - | - |
| 1a.4.7 | NRC Fees | - | - | - | - | - | - | 516 | 52 | 567 | 567 | - | - | - | - | - | - | - | - | - | - | - |
| 1a.4.8 | Emergency Planning Fees | - | - | - | - | - | - | 2,174 | 217 | 2,392 | - | 2,392 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.9 | Fixed Overhead | - | - | - | - | - | - | 1,440 | 216 | 1,656 | 1,656 | - | - | - | - | - | - | - | - | - | - | - |
| 1a.4.10 | Spent Fuel Pool O&M | - | - | - | - | - | - | 422 | 63 | 486 | - | 486 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.11 | ISFSI Operating Costs | - | - | - | - | - | - | 56 | 8 | 64 | - | 64 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.12 | Railroad Track Maintenance | - | - | - | - | - | - | 63 | 9 | 72 | 72 | - | - | - | - | - | - | - | - | - | - | - |
| 1a.4.13 | Security Staff Cost | - | - | - | - | - | - | 8,328 | 1,249 | 9,577 | 9,577 | - | - | - | - | - | - | - | - | - | - | 122,720 |
| 1a.4.14 | Utility Staff Cost | - | - | - | - | - | - | 25,478 | 3,822 | 29,300 | 29,300 | - | - | - | - | - | - | - | - | - | - | 400,944 |
| 1a.4 | Subtotal Period 1a Period-Dependent Costs | - | 1,357 | 12 | 5 | - | 49 | 45,381 | 6,687 | 53,491 | 50,549 | 2,942 | - | - | 597 | - | - | - | - | 11,944 | 19 | 523,664 |
| 1a.0 | TOTAL PERIOD 1a COST | - | 1,357 | 12 | 5 | - | 49 | 58,742 | 8,566 | 68,730 | 63,010 | 5,720 | - | - | 597 | - | - | - | - | 11,944 | 19 | 539,011 |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table H-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|--|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|---------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| PERIOD 1b - SAFSTOR Limited DECON Activities | | | | | | | | | | | | | | | | | | | | | | |
| Period 1b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Decontamination of Site Buildings | | | | | | | | | | | | | | | | | | | | | | |
| 1b.1.1.1 | Reactor | 1,199 | - | - | - | - | - | - | 599 | 1,798 | 1,798 | - | - | - | - | - | - | - | - | - | 17,003 | - |
| 1b.1.1.2 | Auxiliary | 1,244 | - | - | - | - | - | - | 622 | 1,866 | 1,866 | - | - | - | - | - | - | - | - | - | 17,950 | - |
| 1b.1.1.3 | Drum Transfer & Truck Loading Enclosure | 17 | - | - | - | - | - | - | 8 | 25 | 25 | - | - | - | - | - | - | - | - | - | 244 | - |
| 1b.1.1.4 | LLRW Storage Enclosure | 116 | - | - | - | - | - | - | 58 | 175 | 175 | - | - | - | - | - | - | - | - | - | 1,673 | - |
| 1b.1.1.5 | Radwaste | 52 | - | - | - | - | - | - | 26 | 78 | 78 | - | - | - | - | - | - | - | - | - | 749 | - |
| 1b.1.1.6 | Resin Disposal | 15 | - | - | - | - | - | - | 8 | 23 | 23 | - | - | - | - | - | - | - | - | - | 221 | - |
| 1b.1.1.7 | Fuel Handling of Aux Building | 1,014 | - | - | - | - | - | - | 507 | 1,521 | 1,521 | - | - | - | - | - | - | - | - | - | 13,854 | - |
| 1b.1.1 | Totals | 3,658 | - | - | - | - | - | - | 1,829 | 5,486 | 5,486 | - | - | - | - | - | - | - | - | - | 51,694 | - |
| 1b.1 | Subtotal Period 1b Activity Costs | 3,658 | - | - | - | - | - | - | 1,829 | 5,486 | 5,486 | - | - | - | - | - | - | - | - | - | 51,694 | - |
| Period 1b Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 1b.2.1 | Spent Fuel Pool Isolation | - | - | - | - | - | - | 8,450 | 1,268 | 9,718 | 9,718 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.2 | Subtotal Period 1b Additional Costs | - | - | - | - | - | - | 8,450 | 1,268 | 9,718 | 9,718 | - | - | - | - | - | - | - | - | - | - | - |
| Period 1b Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 1b.3.1 | Decon equipment | 1,055 | - | - | - | - | - | - | 158 | 1,213 | 1,213 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.3.2 | Process decommissioning water waste | 107 | - | 71 | 128 | - | 288 | - | 152 | 747 | 747 | - | - | - | 661 | - | - | - | - | - | 39,679 | 129 |
| 1b.3.4 | Small tool allowance | - | 61 | - | - | - | - | - | 9 | 70 | 70 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.3.5 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 309 | 46 | 356 | - | 356 | - | - | - | - | - | - | - | - | - | - |
| 1b.3.6 | Retention and Severance | - | - | - | - | - | - | 2,296 | 344 | 2,640 | 2,640 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.3.7 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 311 | - | 311 | - | 311 | - | - | - | - | - | - | - | - | - | - |
| 1b.3 | Subtotal Period 1b Collateral Costs | 1,162 | 61 | 71 | 128 | - | 288 | 2,917 | 710 | 5,337 | 4,670 | 667 | - | - | 661 | - | - | - | - | - | 39,679 | 129 |
| Period 1b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 1b.4.1 | Decon supplies | 1,334 | - | - | - | - | - | - | 333 | 1,667 | 1,667 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.2 | Insurance | - | - | - | - | - | - | 414 | 41 | 455 | 455 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.3 | Property taxes | - | - | - | - | - | - | 902 | 90 | 993 | 993 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.4 | Health physics supplies | - | 448 | - | - | - | - | - | 112 | 560 | 560 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.5 | Heavy equipment rental | - | 188 | - | - | - | - | - | 28 | 216 | 216 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.6 | Disposal of DAW generated | - | - | 13 | 5 | - | 53 | - | 15 | 86 | 86 | - | - | - | 641 | - | - | - | - | - | 12,830 | 21 |
| 1b.4.7 | Plant energy budget | - | - | - | - | - | - | 404 | 61 | 465 | 465 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.8 | NRC Fees | - | - | - | - | - | - | 98 | 10 | 108 | 108 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.9 | Emergency Planning Fees | - | - | - | - | - | - | 542 | 54 | 596 | - | 596 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.10 | Fixed Overhead | - | - | - | - | - | - | 359 | 54 | 413 | 413 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.11 | Spent Fuel Pool O&M | - | - | - | - | - | - | 105 | 16 | 121 | - | 121 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.12 | ISFSI Operating Costs | - | - | - | - | - | - | 14 | 2 | 16 | - | 16 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.13 | Railroad Track Maintenance | - | - | - | - | - | - | 16 | 2 | 18 | 18 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.14 | Security Staff Cost | - | - | - | - | - | - | 2,076 | 311 | 2,388 | 2,388 | - | - | - | - | - | - | - | - | - | - | 30,596 |
| 1b.4.15 | Utility Staff Cost | - | - | - | - | - | - | 6,714 | 1,007 | 7,722 | 7,722 | - | - | - | - | - | - | - | - | - | - | 105,271 |
| 1b.4 | Subtotal Period 1b Period-Dependent Costs | 1,334 | 635 | 13 | 5 | - | 53 | 11,645 | 2,138 | 15,823 | 15,089 | 733 | - | - | 641 | - | - | - | - | - | 12,830 | 21 |
| 1b.0 | TOTAL PERIOD 1b COST | 6,153 | 696 | 84 | 133 | - | 341 | 23,012 | 5,944 | 36,364 | 34,963 | 1,401 | - | - | 1,303 | - | - | - | - | - | 52,509 | 51,844 |
| PERIOD 1c - Preparations for SAFSTOR Dormancy | | | | | | | | | | | | | | | | | | | | | | |
| Period 1c Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| 1c.1.1 | Prepare support equipment for storage | - | 527 | - | - | - | - | - | 79 | 606 | 606 | - | - | - | - | - | - | - | - | - | 3,000 | - |
| 1c.1.2 | Install containment pressure equal. lines | - | 54 | - | - | - | - | - | 8 | 62 | 62 | - | - | - | - | - | - | - | - | - | 700 | - |
| 1c.1.3 | Interim survey prior to dormancy | - | - | - | - | - | - | 733 | 220 | 953 | 953 | - | - | - | - | - | - | - | - | - | 12,801 | - |
| 1c.1.4 | Secure building accesses | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - | - |
| 1c.1.5 | Prepare & submit interim report | - | - | - | - | - | - | 32 | 5 | 37 | 37 | - | - | - | - | - | - | - | - | - | - | 249 |
| 1c.1 | Subtotal Period 1c Activity Costs | - | 581 | - | - | - | - | 765 | 312 | 1,658 | 1,658 | - | - | - | - | - | - | - | - | - | - | 16,501 |
| Period 1c Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 1c.3.1 | Process decommissioning water waste | 91 | - | 60 | 109 | - | 245 | - | 129 | 634 | 634 | - | - | - | 561 | - | - | - | - | - | 33,685 | 109 |
| 1c.3.3 | Small tool allowance | - | 5 | - | - | - | - | - | 1 | 6 | 6 | - | - | - | - | - | - | - | - | - | - | - |
| 1c.3.4 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 90 | 13 | 103 | - | 103 | - | - | - | - | - | - | - | - | - | - |
| 1c.3.5 | Retention and Severance | - | - | - | - | - | - | 1,722 | 258 | 1,980 | 1,980 | - | - | - | - | - | - | - | - | - | - | - |
| 1c.3.6 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 311 | - | 311 | - | 311 | - | - | - | - | - | - | - | - | - | - |
| 1c.3 | Subtotal Period 1c Collateral Costs | 91 | 5 | 60 | 109 | - | 245 | 2,123 | 401 | 3,034 | 2,619 | 415 | - | - | 561 | - | - | - | - | - | 33,685 | 109 |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table H-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|---|--------------|--------------|-----------------|-----------------|---------------------------|---------------------|---------------|-------------------|----------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| Period 1c Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 1c.4.1 | Insurance | - | - | - | - | - | - | 414 | 41 | 455 | 455 | - | - | - | - | - | - | - | - | - | - |
| 1c.4.2 | Property taxes | - | - | - | - | - | - | 901 | 90 | 991 | 991 | - | - | - | - | - | - | - | - | - | - |
| 1c.4.3 | Health physics supplies | - | 248 | - | - | - | - | - | 62 | 309 | 309 | - | - | - | - | - | - | - | - | - | - |
| 1c.4.4 | Heavy equipment rental | - | 188 | - | - | - | - | - | 28 | 216 | 216 | - | - | - | - | - | - | - | - | - | - |
| 1c.4.5 | Disposal of DAW generated | - | - | 3 | 1 | - | 13 | - | 4 | 20 | 20 | - | - | - | 152 | - | - | - | 3,039 | 5 | - |
| 1c.4.6 | Plant energy budget | - | - | - | - | - | - | 404 | 61 | 465 | 465 | - | - | - | - | - | - | - | - | - | - |
| 1c.4.7 | NRC Fees | - | - | - | - | - | - | 98 | 10 | 108 | 108 | - | - | - | - | - | - | - | - | - | - |
| 1c.4.8 | Emergency Planning Fees | - | - | - | - | - | - | 542 | 54 | 596 | - | 596 | - | - | - | - | - | - | - | - | - |
| 1c.4.9 | Fixed Overhead | - | - | - | - | - | - | 359 | 54 | 413 | 413 | - | - | - | - | - | - | - | - | - | - |
| 1c.4.10 | Spent Fuel Pool O&M | - | - | - | - | - | - | 105 | 16 | 121 | - | 121 | - | - | - | - | - | - | - | - | - |
| 1c.4.11 | ISFSI Operating Costs | - | - | - | - | - | - | 14 | 2 | 16 | - | 16 | - | - | - | - | - | - | - | - | - |
| 1c.4.12 | Railroad Track Maintenance | - | - | - | - | - | - | 16 | 2 | 18 | 18 | - | - | - | - | - | - | - | - | - | - |
| 1c.4.13 | Security Staff Cost | - | - | - | - | - | - | 2,076 | 311 | 2,388 | 2,388 | - | - | - | - | - | - | - | - | - | 30,596 |
| 1c.4.14 | Utility Staff Cost | - | - | - | - | - | - | 6,714 | 1,007 | 7,722 | 7,722 | - | - | - | - | - | - | - | - | - | 105,271 |
| 1c.4 | Subtotal Period 1c Period-Dependent Costs | - | 435 | 3 | 1 | - | 13 | 11,643 | 1,742 | 13,838 | 13,104 | 733 | - | - | 152 | - | - | - | 3,039 | 5 | 135,867 |
| 1c.0 | TOTAL PERIOD 1c COST | 91 | 1,021 | 63 | 110 | - | 257 | 14,531 | 2,456 | 18,530 | 17,382 | 1,148 | - | - | 713 | - | - | - | 36,724 | 16,615 | 136,116 |
| PERIOD 1 TOTALS | | 6,244 | 3,074 | 159 | 248 | - | 647 | 96,285 | 16,965 | 123,623 | 115,354 | 8,269 | - | - | 2,613 | - | - | - | 101,177 | 68,478 | 810,994 |
| PERIOD 2a - SAFSTOR Dormancy with Wet Spent Fuel Storage | | | | | | | | | | | | | | | | | | | | | |
| Period 2a Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| 2a.1.1 | Quarterly Inspection | - | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - |
| 2a.1.2 | Semi-annual environmental survey | - | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - |
| 2a.1.3 | Prepare reports | - | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - |
| 2a.1.4 | Bituminous roof replacement | - | - | - | - | - | - | 223 | 33 | 256 | 256 | - | - | - | - | - | - | - | - | - | - |
| 2a.1.5 | Maintenance supplies | - | - | - | - | - | - | 349 | 87 | 437 | 437 | - | - | - | - | - | - | - | - | - | - |
| 2a.1 | Subtotal Period 2a Activity Costs | - | - | - | - | - | - | 572 | 121 | 693 | 693 | - | - | - | - | - | - | - | - | - | - |
| Period 2a Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 2a.2.1 | Security Modifications | - | - | - | - | - | - | 4,348 | 652 | 5,000 | 5,000 | - | - | - | - | - | - | - | - | - | - |
| 2a.2 | Subtotal Period 2a Additional Costs | - | - | - | - | - | - | 4,348 | 652 | 5,000 | 5,000 | - | - | - | - | - | - | - | - | - | - |
| Period 2a Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 2a.3.1 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 58,271 | 8,741 | 67,011 | - | 67,011 | - | - | - | - | - | - | - | - | - |
| 2a.3.2 | Retention and Severance | - | - | - | - | - | - | 11,054 | 1,658 | 12,712 | 12,712 | - | - | - | - | - | - | - | - | - | - |
| 2a.3.3 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 3,128 | - | 3,128 | - | 3,128 | - | - | - | - | - | - | - | - | - |
| 2a.3 | Subtotal Period 2a Collateral Costs | - | - | - | - | - | - | 72,453 | 10,399 | 82,851 | 12,712 | 70,139 | - | - | - | - | - | - | - | - | - |
| Period 2a Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 2a.4.1 | Insurance | - | - | - | - | - | - | 1,213 | 121 | 1,334 | 1,334 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.2 | Property taxes | - | - | - | - | - | - | 9,065 | 907 | 9,972 | 9,972 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.3 | Health physics supplies | - | 617 | - | - | - | - | - | 154 | 771 | 771 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.4 | Disposal of DAW generated | - | - | 11 | 5 | - | 47 | - | 14 | 77 | 77 | - | - | - | 576 | - | - | - | 11,523 | 19 | - |
| 2a.4.5 | Plant energy budget | - | - | - | - | - | - | 812 | 122 | 934 | 934 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.6 | NRC Fees | - | - | - | - | - | - | 536 | 54 | 590 | 590 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.7 | Emergency Planning Fees | - | - | - | - | - | - | 4,653 | 465 | 5,119 | - | 5,119 | - | - | - | - | - | - | - | - | - |
| 2a.4.8 | Fixed Overhead | - | - | - | - | - | - | 2,979 | 447 | 3,426 | 3,426 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.9 | Spent Fuel Pool O&M | - | - | - | - | - | - | 1,057 | 159 | 1,216 | - | 1,216 | - | - | - | - | - | - | - | - | - |
| 2a.4.10 | ISFSI Operating Costs | - | - | - | - | - | - | 140 | 21 | 161 | - | 161 | - | - | - | - | - | - | - | - | - |
| 2a.4.11 | Railroad Track Maintenance | - | - | - | - | - | - | 385 | 58 | 443 | 443 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.12 | Security Staff Cost | - | - | - | - | - | - | 19,158 | 2,874 | 22,032 | 15,863 | 6,169 | - | - | - | - | - | - | - | - | 281,262 |
| 2a.4.13 | Utility Staff Cost | - | - | - | - | - | - | 13,370 | 2,006 | 15,376 | 12,900 | 2,476 | - | - | - | - | - | - | - | - | 205,738 |
| 2a.4 | Subtotal Period 2a Period-Dependent Costs | - | 617 | 11 | 5 | - | 47 | 53,370 | 7,400 | 61,450 | 46,309 | 15,140 | - | - | 576 | - | - | - | 11,523 | 19 | 486,999 |
| 2a.0 | TOTAL PERIOD 2a COST | - | 617 | 11 | 5 | - | 47 | 130,742 | 18,572 | 149,994 | 64,714 | 85,280 | - | - | 576 | - | - | - | 11,523 | 19 | 486,999 |
| PERIOD 2b - SAFSTOR Dormancy with Dry Spent Fuel Storage | | | | | | | | | | | | | | | | | | | | | |
| Period 2b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| 2b.1.1 | Quarterly Inspection | - | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - |
| 2b.1.2 | Semi-annual environmental survey | - | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - |
| 2b.1.3 | Prepare reports | - | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - |
| 2b.1.4 | Bituminous roof replacement | - | - | - | - | - | - | 3,489 | 523 | 4,013 | 4,013 | - | - | - | - | - | - | - | - | - | - |
| 2b.1.5 | Maintenance supplies | - | - | - | - | - | - | 5,471 | 1,368 | 6,839 | 6,839 | - | - | - | - | - | - | - | - | - | - |
| 2b.1 | Subtotal Period 2b Activity Costs | - | - | - | - | - | - | 8,960 | 1,891 | 10,851 | 10,851 | - | - | - | - | - | - | - | - | - | - |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table H-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|---|--|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|-----------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| Period 2b Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 2b.3.1 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 18,218 | 2,733 | 20,951 | - | 20,951 | - | - | - | - | - | - | - | - | - | - |
| 2b.3.2 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 48,970 | - | 48,970 | - | 48,970 | - | - | - | - | - | - | - | - | - | - |
| 2b.3 | Subtotal Period 2b Collateral Costs | - | - | - | - | - | - | 67,188 | 2,733 | 69,921 | - | 69,921 | - | - | - | - | - | - | - | - | - | - |
| Period 2b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 2b.4.1 | Insurance | - | - | - | - | - | - | 18,984 | 1,898 | 20,882 | 20,882 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.2 | Property taxes | - | - | - | - | - | - | 141,925 | 14,192 | 156,117 | 156,117 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.3 | Health physics supplies | - | 4,453 | - | - | - | - | - | 1,113 | 5,566 | 5,566 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.4 | Disposal of DAW generated | - | - | 80 | 33 | - | 334 | - | 96 | 543 | 543 | - | - | - | 4,049 | - | - | - | - | 80,989 | 132 | - |
| 2b.4.5 | Plant energy budget | - | - | - | - | - | - | 6,356 | 953 | 7,309 | 7,309 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.6 | NRC Fees | - | - | - | - | - | - | 8,078 | 808 | 8,886 | 8,886 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.7 | Emergency Planning Fees | - | - | - | - | - | - | 2,906 | 291 | 3,197 | - | 3,197 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.8 | Fixed Overhead | - | - | - | - | - | - | 6,388 | 958 | 7,346 | 7,346 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.9 | ISFSI Operating Costs | - | - | - | - | - | - | 2,194 | 329 | 2,523 | - | 2,523 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.10 | Railroad Track Maintenance | - | - | - | - | - | - | 2,451 | 368 | 2,819 | 2,819 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.11 | Security Staff Cost | - | - | - | - | - | - | 109,414 | 16,412 | 125,826 | 27,682 | 98,145 | - | - | - | - | - | - | - | - | - | 1,467,751 |
| 2b.4.12 | Utility Staff Cost | - | - | - | - | - | - | 53,539 | 8,031 | 61,570 | 38,666 | 22,904 | - | - | - | - | - | - | - | - | - | 815,417 |
| 2b.4 | Subtotal Period 2b Period-Dependent Costs | - | 4,453 | 80 | 33 | - | 334 | 352,234 | 45,450 | 402,583 | 275,815 | 126,768 | - | - | 4,049 | - | - | - | - | 80,989 | 132 | 2,283,168 |
| 2b.0 | TOTAL PERIOD 2b COST | - | 4,453 | 80 | 33 | - | 334 | 428,382 | 50,074 | 483,356 | 286,666 | 196,689 | - | - | 4,049 | - | - | - | - | 80,989 | 132 | 2,283,168 |
| PERIOD 2c - SAFSTOR Dormancy without Spent Fuel Storage | | | | | | | | | | | | | | | | | | | | | | |
| Period 2c Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| 2c.1.1 | Quarterly Inspection | - | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 2c.1.2 | Semi-annual environmental survey | - | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 2c.1.3 | Prepare reports | - | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 2c.1.4 | Bituminous roof replacement | - | - | - | - | - | - | 913 | 137 | 1,050 | 1,050 | - | - | - | - | - | - | - | - | - | - | - |
| 2c.1.5 | Maintenance supplies | - | - | - | - | - | - | 1,431 | 358 | 1,789 | 1,789 | - | - | - | - | - | - | - | - | - | - | - |
| 2c.1 | Subtotal Period 2c Activity Costs | - | - | - | - | - | - | 2,345 | 495 | 2,839 | 2,839 | - | - | - | - | - | - | - | - | - | - | - |
| Period 2c Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 2c.4.1 | Insurance | - | - | - | - | - | - | 2,866 | 287 | 3,152 | 3,152 | - | - | - | - | - | - | - | - | - | - | - |
| 2c.4.2 | Property taxes | - | - | - | - | - | - | 23,818 | 2,382 | 26,200 | 26,200 | - | - | - | - | - | - | - | - | - | - | - |
| 2c.4.3 | Health physics supplies | - | 1,105 | - | - | - | - | - | 276 | 1,381 | 1,381 | - | - | - | - | - | - | - | - | - | - | - |
| 2c.4.4 | Disposal of DAW generated | - | - | 20 | 8 | - | 81 | - | 23 | 132 | 132 | - | - | - | 985 | - | - | - | - | 19,708 | 32 | - |
| 2c.4.5 | Plant energy budget | - | - | - | - | - | - | 1,663 | 249 | 1,913 | 1,913 | - | - | - | - | - | - | - | - | - | - | - |
| 2c.4.6 | NRC Fees | - | - | - | - | - | - | 2,016 | 202 | 2,217 | 2,217 | - | - | - | - | - | - | - | - | - | - | - |
| 2c.4.7 | Fixed Overhead | - | - | - | - | - | - | 1,671 | 251 | 1,922 | 1,922 | - | - | - | - | - | - | - | - | - | - | - |
| 2c.4.8 | Railroad Track Maintenance | - | - | - | - | - | - | 641 | 96 | 738 | 738 | - | - | - | - | - | - | - | - | - | - | - |
| 2c.4.9 | Utility Staff Cost | - | - | - | - | - | - | 5,093 | 764 | 5,857 | 5,857 | - | - | - | - | - | - | - | - | - | - | 85,343 |
| 2c.4 | Subtotal Period 2c Period-Dependent Costs | - | 1,105 | 20 | 8 | - | 81 | 37,769 | 4,530 | 43,512 | 43,512 | - | - | - | 985 | - | - | - | - | 19,708 | 32 | 85,343 |
| 2c.0 | TOTAL PERIOD 2c COST | - | 1,105 | 20 | 8 | - | 81 | 40,113 | 5,025 | 46,351 | 46,351 | - | - | - | 985 | - | - | - | - | 19,708 | 32 | 85,343 |
| PERIOD 2 TOTALS | | | | | | | | | | | | | | | | | | | | | | |
| - 6,174 111 45 - 462 599,238 73,670 679,701 397,732 281,969 - 5,611 - - 112,220 183 2,855,510 | | | | | | | | | | | | | | | | | | | | | | |
| PERIOD 3a - Reactivate Site Following SAFSTOR Dormancy | | | | | | | | | | | | | | | | | | | | | | |
| Period 3a Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| 3a.1.1 | Prepare preliminary decommissioning cost | - | - | - | - | - | - | 71 | 11 | 82 | 82 | - | - | - | - | - | - | - | - | - | - | 556 |
| 3a.1.2 | Review plant dwgs & specs. | - | - | - | - | - | - | 253 | 38 | 291 | 291 | - | - | - | - | - | - | - | - | - | - | 1,967 |
| 3a.1.3 | Perform detailed rad survey | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - | - |
| 3a.1.4 | End product description | - | - | - | - | - | - | 55 | 8 | 63 | 63 | - | - | - | - | - | - | - | - | - | - | 428 |
| 3a.1.5 | Detailed by-product inventory | - | - | - | - | - | - | 71 | 11 | 82 | 82 | - | - | - | - | - | - | - | - | - | - | 556 |
| 3a.1.6 | Define major work sequence | - | - | - | - | - | - | 412 | 62 | 474 | 474 | - | - | - | - | - | - | - | - | - | - | 3,207 |
| 3a.1.7 | Perform SER and EA | - | - | - | - | - | - | 170 | 26 | 196 | 196 | - | - | - | - | - | - | - | - | - | - | 1,326 |
| 3a.1.8 | Prepare/submit Defueled Technical Specifications | - | - | - | - | - | - | 412 | 62 | 474 | 474 | - | - | - | - | - | - | - | - | - | - | 3,207 |
| 3a.1.9 | Perform Site-Specific Cost Study | - | - | - | - | - | - | 275 | 41 | 316 | 316 | - | - | - | - | - | - | - | - | - | - | 2,138 |
| 3a.1.10 | Prepare/submit Irradiated Fuel Management Plan | - | - | - | - | - | - | 55 | 8 | 63 | 63 | - | - | - | - | - | - | - | - | - | - | 428 |
| Activity Specifications | | | | | | | | | | | | | | | | | | | | | | |
| 3a.1.11.1 | Re-activate plant & temporary facilities | - | - | - | - | - | - | 405 | 61 | 466 | 419 | - | 47 | - | - | - | - | - | - | - | - | 3,151 |
| 3a.1.11.2 | Plant systems | - | - | - | - | - | - | 229 | 34 | 263 | 237 | - | 26 | - | - | - | - | - | - | - | - | 1,782 |
| 3a.1.11.3 | Reactor internals | - | - | - | - | - | - | 390 | 59 | 449 | 449 | - | - | - | - | - | - | - | - | - | - | 3,036 |
| 3a.1.11.4 | Reactor vessel | - | - | - | - | - | - | 357 | 54 | 411 | 411 | - | - | - | - | - | - | - | - | - | - | 2,779 |
| 3a.1.11.5 | Biological shield | - | - | - | - | - | - | 27 | 4 | 32 | 32 | - | - | - | - | - | - | - | - | - | - | 214 |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table H-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| Activity Specifications (continued) | | | | | | | | | | | | | | | | | | | | | |
| 3a.1.11.6 | Steam generators | - | - | - | - | - | - | 171 | 26 | 197 | 197 | - | - | - | - | - | - | - | - | - | 1,334 |
| 3a.1.11.7 | Reinforced concrete | - | - | - | - | - | - | 88 | 13 | 101 | 51 | - | 51 | - | - | - | - | - | - | - | 684 |
| 3a.1.11.8 | Main Turbine | - | - | - | - | - | - | 22 | 3 | 25 | - | - | 25 | - | - | - | - | - | - | - | 171 |
| 3a.1.11.9 | Main Condensers | - | - | - | - | - | - | 22 | 3 | 25 | - | - | 25 | - | - | - | - | - | - | - | 171 |
| 3a.1.11.10 | Plant structures & buildings | - | - | - | - | - | - | 171 | 26 | 197 | 99 | - | 99 | - | - | - | - | - | - | - | 1,334 |
| 3a.1.11.11 | Waste management | - | - | - | - | - | - | 253 | 38 | 291 | 291 | - | - | - | - | - | - | - | - | - | 1,967 |
| 3a.1.11.12 | Facility & site closeout | - | - | - | - | - | - | 49 | 7 | 57 | 28 | - | 28 | - | - | - | - | - | - | - | 385 |
| 3a.1.11 | Total | - | - | - | - | - | - | 2,186 | 328 | 2,514 | 2,213 | - | 301 | - | - | - | - | - | - | - | 17,009 |
| Planning & Site Preparations | | | | | | | | | | | | | | | | | | | | | |
| 3a.1.12 | Prepare dismantling sequence | - | - | - | - | - | - | 132 | 20 | 152 | 152 | - | - | - | - | - | - | - | - | - | 1,026 |
| 3a.1.13 | Plant prep. & temp. svces | - | - | - | - | - | - | 3,500 | 525 | 4,025 | 4,025 | - | - | - | - | - | - | - | - | - | - |
| 3a.1.14 | Design water clean-up system | - | - | - | - | - | - | 77 | 12 | 88 | 88 | - | - | - | - | - | - | - | - | - | 599 |
| 3a.1.15 | Rigging/Cont. Cntrl Envlp/tooling/etc. | - | - | - | - | - | - | 2,400 | 360 | 2,760 | 2,760 | - | - | - | - | - | - | - | - | - | - |
| 3a.1.16 | Procure casks/liners & containers | - | - | - | - | - | - | 68 | 10 | 78 | 78 | - | - | - | - | - | - | - | - | - | 526 |
| 3a.1 | Subtotal Period 3a Activity Costs | - | - | - | - | - | - | 10,137 | 1,521 | 11,658 | 11,357 | - | 301 | - | - | - | - | - | - | - | 32,971 |
| Period 3a Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 3a.2.1 | Site Characterization | - | - | - | - | - | - | 1,505 | 451 | 1,956 | 1,956 | - | - | - | - | - | - | - | - | - | 8,988 |
| 3a.2.2 | Mixed/Hazardous Waste | - | - | 353 | 94 | 178 | - | - | 76 | 702 | 702 | - | - | 6,132 | - | - | - | - | - | 351,977 | 2,348 |
| 3a.2.3 | Asbestos Abatement | - | 2,526 | 3 | 150 | - | 1,369 | - | 996 | 5,044 | 5,044 | - | - | - | 12,843 | - | - | - | - | 166,959 | 20,907 |
| 3a.2 | Subtotal Period 3a Additional Costs | - | 2,526 | 356 | 244 | 178 | 1,369 | 1,505 | 1,524 | 7,702 | 7,702 | - | - | 6,132 | 12,843 | - | - | - | - | 518,936 | 32,243 |
| Period 3a Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 3a.3.1 | Small tool allowance | - | 34 | - | - | - | - | - | 5 | 39 | 39 | - | - | - | - | - | - | - | - | - | - |
| 3a.3 | Subtotal Period 3a Collateral Costs | - | 34 | - | - | - | - | - | 5 | 39 | 39 | - | - | - | - | - | - | - | - | - | - |
| Period 3a Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 3a.4.1 | Insurance | - | - | - | - | - | - | 279 | 28 | 307 | 307 | - | - | - | - | - | - | - | - | - | - |
| 3a.4.2 | Property taxes | - | - | - | - | - | - | 2,249 | 225 | 2,474 | 2,474 | - | - | - | - | - | - | - | - | - | - |
| 3a.4.3 | Health physics supplies | - | 641 | - | - | - | - | - | 160 | 802 | 802 | - | - | - | - | - | - | - | - | - | - |
| 3a.4.4 | Heavy equipment rental | - | 753 | - | - | - | - | - | 113 | 866 | 866 | - | - | - | - | - | - | - | - | - | - |
| 3a.4.5 | Disposal of DAW generated | - | - | 10 | 4 | - | 40 | - | 11 | 64 | 64 | - | - | 481 | - | - | - | - | - | 9,613 | 16 |
| 3a.4.6 | Plant energy budget | - | - | - | - | - | - | 1,621 | 243 | 1,864 | 1,864 | - | - | - | - | - | - | - | - | - | - |
| 3a.4.7 | NRC Fees | - | - | - | - | - | - | 260 | 26 | 286 | 286 | - | - | - | - | - | - | - | - | - | - |
| 3a.4.8 | Fixed Overhead | - | - | - | - | - | - | 1,440 | 216 | 1,656 | 1,656 | - | - | - | - | - | - | - | - | - | - |
| 3a.4.9 | Railroad Track Maintenance | - | - | - | - | - | - | 63 | 9 | 72 | 72 | - | - | - | - | - | - | - | - | - | - |
| 3a.4.10 | Security Staff Cost | - | - | - | - | - | - | 368 | 55 | 424 | 424 | - | - | - | - | - | - | - | - | - | 6,240 |
| 3a.4.11 | Utility Staff Cost | - | - | - | - | - | - | 12,056 | 1,808 | 13,864 | 13,864 | - | - | - | - | - | - | - | - | - | 199,680 |
| 3a.4 | Subtotal Period 3a Period-Dependent Costs | - | 1,394 | 10 | 4 | - | 40 | 18,336 | 2,896 | 22,679 | 22,679 | - | - | - | 481 | - | - | - | - | 9,613 | 16 |
| 3a.0 | TOTAL PERIOD 3a COST | - | 3,954 | 366 | 248 | 178 | 1,409 | 29,979 | 5,946 | 42,079 | 41,778 | - | 301 | 6,132 | 13,324 | - | - | - | - | 528,549 | 32,259 |
| PERIOD 3b - Decommissioning Preparations | | | | | | | | | | | | | | | | | | | | | |
| Period 3b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| Detailed Work Procedures | | | | | | | | | | | | | | | | | | | | | |
| 3b.1.1.1 | Plant systems | - | - | - | - | - | - | 260 | 39 | 299 | 269 | - | 30 | - | - | - | - | - | - | - | 2,024 |
| 3b.1.1.2 | Reactor internals | - | - | - | - | - | - | 137 | 21 | 158 | 158 | - | - | - | - | - | - | - | - | - | 1,069 |
| 3b.1.1.3 | Remaining buildings | - | - | - | - | - | - | 74 | 11 | 85 | 21 | - | 64 | - | - | - | - | - | - | - | 577 |
| 3b.1.1.4 | CRD cooling assembly | - | - | - | - | - | - | 55 | 8 | 63 | 63 | - | - | - | - | - | - | - | - | - | 428 |
| 3b.1.1.5 | CRD housings & ICI tubes | - | - | - | - | - | - | 55 | 8 | 63 | 63 | - | - | - | - | - | - | - | - | - | 428 |
| 3b.1.1.6 | Incore instrumentation | - | - | - | - | - | - | 55 | 8 | 63 | 63 | - | - | - | - | - | - | - | - | - | 428 |
| 3b.1.1.7 | Reactor vessel | - | - | - | - | - | - | 199 | 30 | 229 | 229 | - | - | - | - | - | - | - | - | - | 1,552 |
| 3b.1.1.8 | Facility closeout | - | - | - | - | - | - | 66 | 10 | 76 | 38 | - | 38 | - | - | - | - | - | - | - | 513 |
| 3b.1.1.9 | Missile shields | - | - | - | - | - | - | 25 | 4 | 28 | 28 | - | - | - | - | - | - | - | - | - | 192 |
| 3b.1.1.10 | Biological shield | - | - | - | - | - | - | 66 | 10 | 76 | 76 | - | - | - | - | - | - | - | - | - | 513 |
| 3b.1.1.11 | Steam generators | - | - | - | - | - | - | 253 | 38 | 291 | 291 | - | - | - | - | - | - | - | - | - | 1,967 |
| 3b.1.1.12 | Reinforced concrete | - | - | - | - | - | - | 55 | 8 | 63 | 32 | - | 32 | - | - | - | - | - | - | - | 428 |
| 3b.1.1.13 | Main Turbine | - | - | - | - | - | - | 86 | 13 | 99 | - | - | 99 | - | - | - | - | - | - | - | 667 |
| 3b.1.1.14 | Main Condensers | - | - | - | - | - | - | 86 | 13 | 99 | - | - | 99 | - | - | - | - | - | - | - | 667 |
| 3b.1.1.15 | Auxiliary building | - | - | - | - | - | - | 150 | 23 | 173 | 155 | - | 17 | - | - | - | - | - | - | - | 1,167 |
| 3b.1.1.16 | Reactor building | - | - | - | - | - | - | 150 | 23 | 173 | 155 | - | 17 | - | - | - | - | - | - | - | 1,167 |
| 3b.1.1 | Total | - | - | - | - | - | - | 1,772 | 266 | 2,038 | 1,643 | - | 395 | - | - | - | - | - | - | - | 13,787 |
| 3b.1 | Subtotal Period 3b Activity Costs | - | - | - | - | - | - | 1,772 | 266 | 2,038 | 1,643 | - | 395 | - | - | - | - | - | - | - | 13,787 |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table H-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|--|---|--------------|--------------|-----------------|-----------------|---------------------------|---------------------|---------------|-------------------|---------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| Period 3b Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 3b.3.1 | Decon equipment | 1,055 | - | - | - | - | - | - | 158 | 1,213 | 1,213 | - | - | - | - | - | - | - | - | - | - |
| 3b.3.2 | DOC staff relocation expenses | - | - | - | - | - | - | 1,264 | 190 | 1,454 | 1,454 | - | - | - | - | - | - | - | - | - | - |
| 3b.3.3 | Pipe cutting equipment | - | 1,200 | - | - | - | - | - | 180 | 1,380 | 1,380 | - | - | - | - | - | - | - | - | - | - |
| 3b.3 | Subtotal Period 3b Collateral Costs | 1,055 | 1,200 | - | - | - | - | 1,264 | 528 | 4,047 | 4,047 | - | - | - | - | - | - | - | - | - | - |
| Period 3b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 3b.4.1 | Decon supplies | 38 | - | - | - | - | - | - | 9 | 47 | 47 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.2 | Insurance | - | - | - | - | - | - | 241 | 24 | 266 | 266 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.3 | Property taxes | - | - | - | - | - | - | 1,019 | 102 | 1,121 | 1,121 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.4 | Health physics supplies | - | 274 | - | - | - | - | - | 68 | 342 | 342 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.5 | Heavy equipment rental | - | 375 | - | - | - | - | - | 56 | 432 | 432 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.6 | Disposal of DAW generated | - | - | 5 | 2 | - | 22 | - | 6 | 35 | 35 | - | - | - | 264 | - | - | - | 5,286 | 9 | - |
| 3b.4.7 | Plant energy budget | - | - | - | - | - | - | 808 | 121 | 930 | 930 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.8 | NRC Fees | - | - | - | - | - | - | 129 | 13 | 142 | 142 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.9 | Fixed Overhead | - | - | - | - | - | - | 718 | 108 | 826 | 826 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.10 | Railroad Track Maintenance | - | - | - | - | - | - | 31 | 5 | 36 | 36 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.11 | Security Staff Cost | - | - | - | - | - | - | 184 | 28 | 211 | 211 | - | - | - | - | - | - | - | - | - | 3,111 |
| 3b.4.12 | DOC Staff Cost | - | - | - | - | - | - | 3,727 | 559 | 4,287 | 4,287 | - | - | - | - | - | - | - | - | - | 42,523 |
| 3b.4.13 | Utility Staff Cost | - | - | - | - | - | - | 6,011 | 902 | 6,913 | 6,913 | - | - | - | - | - | - | - | - | - | 99,566 |
| 3b.4 | Subtotal Period 3b Period-Dependent Costs | 38 | 649 | 5 | 2 | - | 22 | 12,870 | 2,002 | 15,588 | 15,588 | - | - | - | 264 | - | - | - | 5,286 | 9 | 145,201 |
| 3b.0 | TOTAL PERIOD 3b COST | 1,092 | 1,849 | 5 | 2 | - | 22 | 15,906 | 2,795 | 21,672 | 21,277 | - | 395 | - | 264 | - | - | - | 5,286 | 9 | 158,988 |
| PERIOD 3 TOTALS | | 1,092 | 5,803 | 371 | 250 | 178 | 1,430 | 45,885 | 8,741 | 63,751 | 63,054 | - | 696 | 6,132 | 13,588 | - | - | - | 533,835 | 32,267 | 401,442 |
| PERIOD 4a - Large Component Removal | | | | | | | | | | | | | | | | | | | | | |
| Period 4a Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| Nuclear Steam Supply System Removal | | | | | | | | | | | | | | | | | | | | | |
| 4a.1.1.1 | Reactor Coolant Piping | 11 | 42 | 10 | 11 | 66 | 94 | - | 52 | 285 | 285 | - | - | 240 | 254 | - | - | - | 33,680 | 778 | - |
| 4a.1.1.2 | Pressurizer Relief Tank | 5 | 19 | 6 | 7 | 44 | 62 | - | 31 | 174 | 174 | - | - | 160 | 169 | - | - | - | 22,441 | 352 | - |
| 4a.1.1.3 | Reactor Coolant Pumps & Motors | 13 | 60 | 46 | 85 | - | 463 | - | 155 | 822 | 822 | - | - | - | 2,332 | - | - | - | 295,800 | 1,232 | 80 |
| 4a.1.1.4 | Pressurizer | - | 77 | 382 | 91 | - | 776 | - | 265 | 1,591 | 1,591 | - | - | - | 2,196 | - | - | - | 158,199 | 1,346 | 750 |
| 4a.1.1.5 | Steam Generators | - | 3,307 | 1,690 | 1,743 | 2,409 | 3,885 | - | 2,590 | 15,625 | 15,625 | - | - | 18,672 | 10,990 | - | - | - | 1,581,180 | 10,253 | 2,250 |
| 4a.1.1.6 | CRDMs/ICIs/Service Structure Removal | 63 | 248 | 205 | 44 | 326 | 454 | - | 283 | 1,623 | 1,623 | - | - | 2,138 | 2,146 | - | - | - | 165,025 | 4,449 | - |
| 4a.1.1.7 | Reactor Vessel Internals | 51 | 4,650 | 11,350 | 862 | - | 7,848 | 278 | 10,531 | 35,570 | 35,570 | - | - | - | 1,174 | - | 673 | - | 167,337 | 22,373 | 1,053 |
| 4a.1.1.8 | Vessel & Internals GTCC Disposal | - | - | - | - | - | 8,680 | - | 1,302 | 9,982 | 9,982 | - | - | - | - | - | 1,773 | - | 344,823 | - | - |
| 4a.1.1.9 | Reactor Vessel | - | 5,835 | 1,653 | 442 | - | 3,268 | 278 | 6,576 | 18,053 | 18,053 | - | - | - | 9,245 | - | - | - | 579,324 | 22,373 | 1,053 |
| 4a.1.1 | Totals | 144 | 14,237 | 15,343 | 3,284 | 2,845 | 25,531 | 556 | 21,785 | 83,725 | 83,725 | - | - | 21,210 | 28,505 | - | 673 | 1,773 | 3,347,810 | 63,151 | 5,187 |
| Removal of Major Equipment | | | | | | | | | | | | | | | | | | | | | |
| 4a.1.2 | Main Turbine/Generator | - | 292 | 116 | 35 | 555 | - | - | 173 | 1,170 | 1,170 | - | - | 2,243 | - | - | - | - | 134,601 | 4,116 | - |
| 4a.1.3 | Main Condensers | - | 2,510 | 79 | 33 | 742 | - | - | 752 | 4,115 | 4,115 | - | - | 4,000 | - | - | - | - | 180,000 | 34,978 | - |
| Cascading Costs from Clean Building Demolition | | | | | | | | | | | | | | | | | | | | | |
| 4a.1.4.1 | Reactor | - | 794 | - | - | - | - | - | 119 | 913 | 913 | - | - | - | - | - | - | - | - | 7,589 | - |
| 4a.1.4.2 | Auxiliary | - | 221 | - | - | - | - | - | 33 | 254 | 254 | - | - | - | - | - | - | - | - | 1,309 | - |
| 4a.1.4.3 | Radwaste | - | 9 | - | - | - | - | - | 1 | 10 | 10 | - | - | - | - | - | - | - | - | 65 | - |
| 4a.1.4 | Totals | - | 1,023 | - | - | - | - | - | 154 | 1,177 | 1,177 | - | - | - | - | - | - | - | - | 8,963 | - |
| Disposal of Plant Systems | | | | | | | | | | | | | | | | | | | | | |
| 4a.1.5.1 | Admin Bldg Ventilation | - | 6 | - | - | - | - | - | 1 | 7 | - | - | 7 | - | - | - | - | - | - | 90 | - |
| 4a.1.5.2 | Air Removal | - | 29 | - | - | - | - | - | 4 | 33 | - | - | 33 | - | - | - | - | - | - | 422 | - |
| 4a.1.5.3 | Auxiliary Feedwater | - | 46 | - | - | - | - | - | 7 | 53 | - | - | 53 | - | - | - | - | - | - | 676 | - |
| 4a.1.5.4 | Auxiliary Feedwater - RCA | - | 38 | 0 | 1 | 30 | - | - | 14 | 84 | 84 | - | - | 178 | - | - | - | - | 7,214 | 486 | - |
| 4a.1.5.5 | Bleed Steam | - | 90 | - | - | - | - | - | 13 | 103 | - | - | 103 | - | - | - | - | - | - | 1,331 | - |
| 4a.1.5.6 | Caustic Addition - RCA | - | 40 | 0 | 2 | 40 | - | - | 16 | 99 | 99 | - | - | 240 | - | - | - | - | 9,761 | 468 | - |
| 4a.1.5.7 | Chemical Feed | - | 17 | - | - | - | - | - | 3 | 20 | - | - | 20 | - | - | - | - | - | - | 261 | - |
| 4a.1.5.8 | Chemical Feed - RCA | - | 3 | 0 | 0 | 3 | - | - | 1 | 7 | 7 | - | - | 16 | - | - | - | - | 634 | 31 | - |
| 4a.1.5.9 | Circulating Water | - | 27 | - | - | - | - | - | 4 | 32 | - | - | 32 | - | - | - | - | - | - | 401 | - |
| 4a.1.5.10 | Condensate | - | 525 | - | - | - | - | - | 79 | 603 | - | - | 603 | - | - | - | - | - | - | 7,537 | - |
| 4a.1.5.11 | Condensate Polishing | - | 208 | - | - | - | - | - | 31 | 239 | - | - | 239 | - | - | - | - | - | - | 2,987 | - |
| 4a.1.5.12 | Condensate Polishing - RCA | - | 38 | 1 | 4 | 81 | - | - | 22 | 145 | 145 | - | - | 483 | - | - | - | - | 19,616 | 493 | - |
| 4a.1.5.13 | Electro-Hydraulic | - | 10 | - | - | - | - | - | 1 | 11 | - | - | 11 | - | - | - | - | - | - | 143 | - |
| 4a.1.5.14 | External Circulating Water | - | 26 | - | - | - | - | - | 4 | 30 | - | - | 30 | - | - | - | - | - | - | 385 | - |
| 4a.1.5.15 | External Circulating Water - RCA | - | 72 | 1 | 5 | 121 | - | - | 37 | 237 | 237 | - | - | 721 | - | - | - | - | 29,284 | 938 | - |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table H-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|---------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| Disposal of Plant Systems (continued) | | | | | | | | | | | | | | | | | | | | | | |
| 4a.1.5.16 | Feedwater | - | 127 | - | - | - | - | - | 19 | 146 | - | - | 146 | - | - | - | - | - | - | - | 1,840 | - |
| 4a.1.5.17 | Feedwater - RCA | - | 248 | 8 | 31 | 694 | - | - | 171 | 1,152 | 1,152 | - | - | 4,147 | - | - | - | - | - | 168,414 | 3,377 | - |
| 4a.1.5.18 | Gland Seal | - | 34 | - | - | - | - | - | 5 | 39 | - | - | 39 | - | - | - | - | - | - | - | 504 | - |
| 4a.1.5.19 | Heater Drain | - | 384 | - | - | - | - | - | 58 | 441 | - | - | 441 | - | - | - | - | - | - | - | 5,638 | - |
| 4a.1.5.20 | Hypobromous Acid Feed | - | 6 | - | - | - | - | - | 1 | 7 | - | - | 7 | - | - | - | - | - | - | - | 86 | - |
| 4a.1.5.21 | Hypobromous Acid Feed - RCA | - | 1 | 0 | 0 | 0 | - | - | 0 | 2 | 2 | - | - | 2 | - | - | - | - | - | 100 | 12 | - |
| 4a.1.5.22 | Internal Circ Water & CDSR | - | 25 | - | - | - | - | - | 4 | 29 | - | - | 29 | - | - | - | - | - | - | - | 366 | - |
| 4a.1.5.23 | Main Gen/Exciter/Transformer | - | 0 | - | - | - | - | - | 0 | 0 | - | - | 0 | - | - | - | - | - | - | - | 5 | - |
| 4a.1.5.24 | Main Steam | - | 101 | - | - | - | - | - | 15 | 116 | - | - | 116 | - | - | - | - | - | - | - | 1,482 | - |
| 4a.1.5.25 | Main Steam - RCA | - | 380 | 11 | 38 | 864 | - | - | 231 | 1,525 | 1,525 | - | - | 5,166 | - | - | - | - | - | 209,799 | 5,146 | - |
| 4a.1.5.26 | Repairable Spare Snubbers | - | 6 | 0 | 0 | 2 | - | - | 2 | 10 | 10 | - | - | 12 | - | - | - | - | - | 490 | 82 | - |
| 4a.1.5.27 | Steam Exclusion | - | 2 | - | - | - | - | - | 0 | 2 | - | - | 2 | - | - | - | - | - | - | - | 32 | - |
| 4a.1.5.28 | Steam Exclusion - RCA | - | 4 | 0 | 0 | 4 | - | - | 2 | 10 | 10 | - | - | 24 | - | - | - | - | - | 966 | 47 | - |
| 4a.1.5.29 | Steam Generator Blowdown | - | 378 | 21 | 27 | 319 | 215 | - | 202 | 1,162 | 1,162 | - | - | 1,906 | 631 | - | - | - | - | 118,130 | 5,179 | - |
| 4a.1.5.30 | Steam Generators | - | 5 | - | - | - | - | - | 1 | 6 | - | - | 6 | - | - | - | - | - | - | - | 75 | - |
| 4a.1.5.31 | Turbine & Moisture Separators | - | 377 | - | - | - | - | - | 57 | 434 | - | - | 434 | - | - | - | - | - | - | - | 5,472 | - |
| 4a.1.5.32 | Turbine Oil Purification | - | 53 | - | - | - | - | - | 8 | 61 | - | - | 61 | - | - | - | - | - | - | - | 757 | - |
| 4a.1.5.33 | Water Treatment | - | 453 | - | - | - | - | - | 68 | 521 | - | - | 521 | - | - | - | - | - | - | - | 6,677 | - |
| 4a.1.5.34 | Water Treatment - RCA | - | 20 | 0 | 1 | 19 | - | - | 8 | 49 | 49 | - | - | 115 | - | - | - | - | - | 4,652 | 252 | - |
| 4a.1.5 | Totals | - | 3,779 | 43 | 108 | 2,177 | 215 | - | 1,091 | 7,413 | 4,480 | - | 2,933 | 13,010 | 631 | - | - | - | - | 569,060 | 53,681 | - |
| 4a.1.6 | Scaffolding in support of decommissioning | - | 2,865 | 22 | 10 | 188 | 30 | - | 755 | 3,870 | 3,870 | - | - | 1,012 | 89 | - | - | - | - | 51,216 | 23,719 | - |
| 4a.1 | Subtotal Period 4a Activity Costs | 144 | 24,706 | 15,603 | 3,470 | 6,506 | 25,776 | 556 | 24,709 | 101,471 | 98,537 | - | 2,933 | 41,476 | 29,226 | - | 673 | 1,773 | 4,282,686 | 188,606 | 5,187 | - |
| Period 4a Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 4a.2.1 | Retired RPV Upper Internals Package | - | 128 | 166 | 58 | - | 1,583 | - | 944 | 2,879 | 2,879 | - | - | - | 572 | 125 | - | - | - | 49,800 | 1,667 | 67 |
| 4a.2 | Subtotal Period 4a Additional Costs | - | 128 | 166 | 58 | - | 1,583 | - | 944 | 2,879 | 2,879 | - | - | - | 572 | 125 | - | - | - | 49,800 | 1,667 | 67 |
| Period 4a Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 4a.3.1 | Process decommissioning water waste | 3 | - | 4 | 8 | - | 17 | - | 7 | 39 | 39 | - | - | - | 40 | - | - | - | - | 2,408 | 8 | - |
| 4a.3.3 | Small tool allowance | - | 241 | - | - | - | - | - | 36 | 277 | 249 | - | 28 | - | - | - | - | - | - | - | - | - |
| 4a.3 | Subtotal Period 4a Collateral Costs | 3 | 241 | 4 | 8 | - | 17 | - | 43 | 316 | 288 | - | 28 | - | 40 | - | - | - | - | 2,408 | 8 | - |
| Period 4a Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 4a.4.1 | Decon supplies | 100 | - | - | - | - | - | - | 25 | 125 | 125 | - | - | - | - | - | - | - | - | - | - | - |
| 4a.4.2 | Insurance | - | - | - | - | - | - | 643 | 64 | 708 | 708 | - | - | - | - | - | - | - | - | - | - | - |
| 4a.4.3 | Property taxes | - | - | - | - | - | - | 2,668 | 267 | 2,935 | 2,935 | - | - | - | - | - | - | - | - | - | - | - |
| 4a.4.4 | Health physics supplies | - | 1,881 | - | - | - | - | - | 470 | 2,351 | 2,351 | - | - | - | - | - | - | - | - | - | - | - |
| 4a.4.5 | Heavy equipment rental | - | 3,325 | - | - | - | - | - | 499 | 3,824 | 3,824 | - | - | - | - | - | - | - | - | - | - | - |
| 4a.4.6 | Disposal of DAW generated | - | - | 70 | 29 | - | 293 | - | 85 | 477 | 477 | - | - | - | 3,554 | - | - | - | - | 71,089 | 116 | - |
| 4a.4.7 | Plant energy budget | - | - | - | - | - | - | 2,047 | 307 | 2,354 | 2,354 | - | - | - | - | - | - | - | - | - | - | - |
| 4a.4.8 | NRC Fees | - | - | - | - | - | - | 420 | 42 | 461 | 461 | - | - | - | - | - | - | - | - | - | - | - |
| 4a.4.9 | Fixed Overhead | - | - | - | - | - | - | 1,581 | 237 | 1,818 | 1,818 | - | - | - | - | - | - | - | - | - | - | - |
| 4a.4.10 | Liquid Radwaste Processing Equipment/Services | - | - | - | - | - | - | 565 | 85 | 649 | 649 | - | - | - | - | - | - | - | - | - | - | - |
| 4a.4.11 | Railroad Track Maintenance | - | - | - | - | - | - | 83 | 12 | 96 | 96 | - | - | - | - | - | - | - | - | - | - | - |
| 4a.4.12 | Remedial Actions Surveys | - | - | - | - | - | - | 1,489 | 223 | 1,712 | 1,712 | - | - | - | - | - | - | - | - | - | - | - |
| 4a.4.13 | Security Staff Cost | - | - | - | - | - | - | 4,486 | 673 | 5,159 | 5,159 | - | - | - | - | - | - | - | - | - | - | 67,000 |
| 4a.4.14 | DOC Staff Cost | - | - | - | - | - | - | 17,103 | 2,565 | 19,668 | 19,668 | - | - | - | - | - | - | - | - | - | - | 189,200 |
| 4a.4.15 | Utility Staff Cost | - | - | - | - | - | - | 21,194 | 3,179 | 24,374 | 24,374 | - | - | - | - | - | - | - | - | - | - | 335,701 |
| 4a.4 | Subtotal Period 4a Period-Dependent Costs | 100 | 5,206 | 70 | 29 | - | 293 | 52,278 | 8,734 | 66,709 | 66,709 | - | - | - | 3,554 | - | - | - | - | 71,089 | 116 | 591,901 |
| 4a.0 | TOTAL PERIOD 4a COST | 246 | 30,281 | 15,844 | 3,564 | 6,506 | 27,669 | 52,834 | 34,430 | 171,375 | 168,414 | - | 2,961 | 41,476 | 33,393 | 125 | 673 | 1,773 | 4,405,984 | 190,397 | 597,154 | - |
| PERIOD 4b - Site Decontamination | | | | | | | | | | | | | | | | | | | | | | |
| Period 4b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| 4b.1.1 | Remove spent fuel racks | 314 | 35 | 86 | 41 | - | 703 | - | 356 | 1,535 | 1,535 | - | - | - | 2,092 | - | - | - | - | 132,919 | 576 | - |
| Disposal of Plant Systems | | | | | | | | | | | | | | | | | | | | | | |
| 4b.1.2.1 | ADT & Misc Ventilation | - | 22 | 1 | 1 | 26 | 3 | - | 10 | 63 | 63 | - | - | 153 | 9 | - | - | - | - | 6,803 | 325 | - |
| 4b.1.2.2 | Aux Bldg Normal Ventilation | - | 62 | 2 | 6 | 116 | 13 | - | 37 | 237 | 237 | - | - | 692 | 39 | - | - | - | - | 30,595 | 906 | - |
| 4b.1.2.3 | Aux Bldg Special Ventilation | - | 12 | 0 | 1 | 12 | 2 | - | 5 | 32 | 32 | - | - | 70 | 6 | - | - | - | - | 3,234 | 176 | - |
| 4b.1.2.4 | Battery Rm Special Ventilation | - | 2 | - | - | - | - | - | 0 | 2 | - | - | 2 | - | - | - | - | - | - | - | 24 | - |
| 4b.1.2.5 | Boron Recycle | - | 3 | 0 | 0 | 0 | 3 | - | 2 | 9 | 9 | - | - | 3 | 9 | - | - | - | - | 700 | 45 | - |
| 4b.1.2.6 | Chemical & Volume Control | - | 858 | 62 | 57 | 394 | 677 | - | 458 | 2,507 | 2,507 | - | - | 2,356 | 1,977 | - | - | - | - | 223,753 | 11,575 | - |
| 4b.1.2.7 | Cold Chemical Lab Ventilation | - | 1 | - | - | - | - | - | 0 | 1 | - | - | 1 | - | - | - | - | - | - | - | 9 | - |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table H-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---------------------------------------|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| Disposal of Plant Systems (continued) | | | | | | | | | | | | | | | | | | | | | |
| 4b.1.2.8 | Component Cooling - RCA | - | 647 | 25 | 88 | 2,007 | - | - | 479 | 3,246 | 3,246 | - | - | 11,996 | - | - | - | - | 487,169 | 8,583 | - |
| 4b.1.2.9 | Containment Cooling | - | 35 | - | - | - | - | - | 5 | 40 | - | - | 40 | - | - | - | - | - | - | 502 | - |
| 4b.1.2.10 | Containment Cooling - RCA | - | 302 | 6 | 20 | 459 | - | - | 148 | 934 | 934 | - | - | 2,743 | - | - | - | - | 111,390 | 3,949 | - |
| 4b.1.2.11 | Containment Hydrogen Control - RCA | - | 36 | 0 | 1 | 24 | - | - | 13 | 74 | 74 | - | - | 141 | - | - | - | - | 5,742 | 494 | - |
| 4b.1.2.12 | Containment Spray - RCA | - | 194 | 3 | 11 | 243 | - | - | 87 | 538 | 538 | - | - | 1,453 | - | - | - | - | 59,019 | 2,617 | - |
| 4b.1.2.13 | Containment Ventilation | - | 211 | 23 | 49 | 790 | 243 | - | 242 | 1,558 | 1,558 | - | - | 4,721 | 722 | - | - | - | 237,643 | 3,016 | - |
| 4b.1.2.14 | Control/Relay/Cmpt Rm Vent | - | 28 | 1 | 2 | 44 | 7 | - | 16 | 98 | 98 | - | - | 260 | 20 | - | - | - | 11,878 | 406 | - |
| 4b.1.2.15 | Cooling Water | - | 159 | - | - | - | - | - | 24 | 183 | - | - | 183 | - | - | - | - | - | - | 2,344 | - |
| 4b.1.2.16 | Cooling Water - RCA | - | 476 | 17 | 62 | 1,412 | - | - | 342 | 2,310 | 2,310 | - | - | 8,442 | - | - | - | - | 342,822 | 6,311 | - |
| 4b.1.2.17 | Cranes/Hoists/Elevators - RCA | - | 3 | 0 | 1 | 17 | - | - | 4 | 25 | 25 | - | - | 103 | - | - | - | - | 4,184 | 48 | - |
| 4b.1.2.18 | D3 Emergency Diesel | - | 10 | - | - | - | - | - | 2 | 12 | - | - | 12 | - | - | - | - | - | - | 141 | - |
| 4b.1.2.19 | D4 Emergency Diesel | - | 10 | - | - | - | - | - | 2 | 12 | - | - | 12 | - | - | - | - | - | - | 141 | - |
| 4b.1.2.20 | D5 Emergency Diesel | - | 0 | - | - | - | - | - | 0 | 0 | - | - | 0 | - | - | - | - | - | - | 5 | - |
| 4b.1.2.21 | Electrical - Clean | - | 1,714 | - | - | - | - | - | 257 | 1,972 | - | - | 1,972 | - | - | - | - | - | - | 24,276 | - |
| 4b.1.2.22 | Electrical - Contaminated | - | 430 | 5 | 16 | 334 | 25 | - | 167 | 978 | 978 | - | - | 1,997 | 75 | - | - | - | 85,887 | 5,813 | - |
| 4b.1.2.23 | Electrical - Contaminated - Fuel Pool | - | 184 | 2 | 7 | 145 | 11 | - | 72 | 421 | 421 | - | - | 864 | 33 | - | - | - | 37,167 | 2,488 | - |
| 4b.1.2.24 | Electrical - Decontaminated | - | 2,955 | 38 | 138 | 3,138 | - | - | 1,234 | 7,503 | 7,503 | - | - | 18,753 | - | - | - | - | 761,569 | 38,423 | - |
| 4b.1.2.25 | Electrical - Decontaminated - Fuel Pool | - | 1,269 | 17 | 59 | 1,350 | - | - | 530 | 3,225 | 3,225 | - | - | 8,069 | - | - | - | - | 327,668 | 16,495 | - |
| 4b.1.2.26 | Filter Rm Ventilation | - | 4 | 0 | 0 | 4 | 0 | - | 2 | 10 | 10 | - | - | 24 | 1 | - | - | - | 1,017 | 61 | - |
| 4b.1.2.27 | Fire Protection & Detection | - | 204 | - | - | - | - | - | 31 | 235 | - | - | 235 | - | - | - | - | - | - | 3,009 | - |
| 4b.1.2.28 | Fire Protection & Detection - RCA | - | 246 | 4 | 13 | 306 | - | - | 110 | 679 | 679 | - | - | 1,828 | - | - | - | - | 74,245 | 3,134 | - |
| 4b.1.2.29 | Fire Protection & Detection - RCA Fuel P | - | 37 | 1 | 2 | 48 | - | - | 17 | 105 | 105 | - | - | 286 | - | - | - | - | 11,622 | 476 | - |
| 4b.1.2.30 | Fuel Handling | - | 66 | 1 | 2 | 34 | 17 | - | 26 | 146 | 146 | - | - | 200 | 49 | - | - | - | 11,273 | 983 | - |
| 4b.1.2.31 | Fuel Oil | - | 1 | - | - | - | - | - | 0 | 1 | - | - | 1 | - | - | - | - | - | - | 9 | - |
| 4b.1.2.32 | HVAC - Clean | - | 151 | - | - | - | - | - | 23 | 174 | - | - | 174 | - | - | - | - | - | - | 2,373 | - |
| 4b.1.2.33 | HVAC - Contaminated | - | 1,112 | 29 | 87 | 1,798 | 136 | - | 598 | 3,759 | 3,759 | - | - | 10,745 | 405 | - | - | - | 462,103 | 14,282 | - |
| 4b.1.2.34 | HVAC - Contaminated - Fuel Pool | - | 499 | 13 | 39 | 808 | 61 | - | 268 | 1,689 | 1,689 | - | - | 4,828 | 182 | - | - | - | 207,612 | 6,417 | - |
| 4b.1.2.35 | Heating | - | 322 | - | - | - | - | - | 48 | 370 | - | - | 370 | - | - | - | - | - | - | 4,804 | - |
| 4b.1.2.36 | Heating - RCA | - | 337 | 4 | 14 | 319 | - | - | 135 | 809 | 809 | - | - | 1,907 | - | - | - | - | 77,458 | 4,086 | - |
| 4b.1.2.37 | Hot Lab & Sample Rm Ventilation | - | 17 | 0 | 1 | 18 | 1 | - | 8 | 46 | 46 | - | - | 107 | 4 | - | - | - | 4,622 | 255 | - |
| 4b.1.2.38 | Incore Instrumentation | - | 27 | 1 | 2 | 10 | 20 | - | 13 | 73 | 73 | - | - | 60 | 58 | - | - | - | 6,143 | 412 | - |
| 4b.1.2.39 | Misc Drains & Vents | - | 213 | 12 | 12 | 77 | 145 | - | 104 | 563 | 563 | - | - | 458 | 426 | - | - | - | 46,079 | 2,841 | - |
| 4b.1.2.40 | Misc Lab & Service Areas Vent | - | 118 | 8 | 8 | 62 | 84 | - | 62 | 342 | 342 | - | - | 370 | 244 | - | - | - | 30,899 | 1,537 | - |
| 4b.1.2.41 | Miscellaneous Gas | - | 72 | - | - | - | - | - | 11 | 83 | - | - | 83 | - | - | - | - | - | - | 1,073 | - |
| 4b.1.2.42 | Miscellaneous Gas - RCA | - | 134 | 1 | 4 | 100 | - | - | 49 | 289 | 289 | - | - | 600 | - | - | - | - | 24,378 | 1,636 | - |
| 4b.1.2.43 | Radiation Monitoring | - | 7 | - | - | - | - | - | 1 | 9 | - | - | 9 | - | - | - | - | - | - | 111 | - |
| 4b.1.2.44 | Radiation Monitoring - RCA | - | 65 | 1 | 2 | 53 | - | - | 25 | 145 | 145 | - | - | 316 | - | - | - | - | 12,826 | 782 | - |
| 4b.1.2.45 | Reactor Coolant | - | 216 | 20 | 16 | 38 | 249 | - | 126 | 666 | 666 | - | - | 229 | 730 | - | - | - | 56,440 | 2,891 | - |
| 4b.1.2.46 | Reactor Hot Sampling | - | 116 | 11 | 7 | 9 | 108 | - | 60 | 311 | 311 | - | - | 54 | 312 | - | - | - | 22,678 | 1,499 | - |
| 4b.1.2.47 | Reactor Makeup | - | 41 | - | - | - | - | - | 6 | 47 | - | - | 47 | - | - | - | - | - | - | 583 | - |
| 4b.1.2.48 | Reactor Makeup - RCA | - | 4 | 0 | 0 | 5 | - | - | 2 | 11 | 11 | - | - | 28 | - | - | - | - | 1,148 | 47 | - |
| 4b.1.2.49 | Reactor Vessel | - | 16 | 1 | 0 | 4 | 5 | - | 6 | 32 | 32 | - | - | 22 | 14 | - | - | - | 1,816 | 225 | - |
| 4b.1.2.50 | Residual Heat Removal | - | 354 | 84 | 86 | 477 | 1,102 | - | 457 | 2,562 | 2,562 | - | - | 2,853 | 3,244 | - | - | - | 324,232 | 5,039 | - |
| 4b.1.2.51 | Safeguards Chilled Water | - | 5 | - | - | - | - | - | 1 | 6 | - | - | 6 | - | - | - | - | - | - | 75 | - |
| 4b.1.2.52 | Safeguards Chilled Water - RCA | - | 5 | 0 | 0 | 4 | - | - | 2 | 11 | 11 | - | - | 26 | - | - | - | - | 1,045 | 51 | - |
| 4b.1.2.53 | Safety Injection | - | 793 | 42 | 72 | 1,117 | 395 | - | 479 | 2,898 | 2,898 | - | - | 6,676 | 1,161 | - | - | - | 345,708 | 11,029 | - |
| 4b.1.2.54 | Sampling | - | 48 | 3 | 2 | 6 | 32 | - | 22 | 113 | 113 | - | - | 37 | 93 | - | - | - | 7,628 | 645 | - |
| 4b.1.2.55 | Service Bldg & New Cmpt Vent | - | 0 | - | - | - | - | - | 0 | 0 | - | - | 0 | - | - | - | - | - | - | 6 | - |
| 4b.1.2.56 | Shield Bldg Ventilation | - | 108 | 13 | 25 | 339 | 163 | - | 124 | 771 | 771 | - | - | 2,028 | 484 | - | - | - | 113,139 | 1,555 | - |
| 4b.1.2.57 | Spent Fuel Pool Cooling | - | 33 | 3 | 2 | 6 | 37 | - | 19 | 101 | 101 | - | - | 39 | 107 | - | - | - | 8,481 | 427 | - |
| 4b.1.2.58 | Spent Fuel Pool Normal Ventilation | - | 24 | 1 | 2 | 44 | 4 | - | 14 | 90 | 90 | - | - | 265 | 12 | - | - | - | 11,505 | 352 | - |
| 4b.1.2.59 | Station & Instrument Air | - | 161 | - | - | - | - | - | 24 | 185 | - | - | 185 | - | - | - | - | - | - | 2,424 | - |
| 4b.1.2.60 | Station & Instrument Air - RCA | - | 299 | 3 | 12 | 272 | - | - | 118 | 704 | 704 | - | - | 1,625 | - | - | - | - | 65,986 | 3,638 | - |
| 4b.1.2.61 | Turbine Bldg Traps & Drains | - | 30 | - | - | - | - | - | 5 | 35 | - | - | 35 | - | - | - | - | - | - | 462 | - |
| 4b.1.2.62 | Turbine Bldg Traps & Drains - RCA | - | 30 | 0 | 1 | 30 | - | - | 12 | 73 | 73 | - | - | 180 | - | - | - | - | 7,321 | 344 | - |
| 4b.1.2.63 | Turbine Bldg Ventilation | - | 46 | - | - | - | - | - | 7 | 53 | - | - | 53 | - | - | - | - | - | - | 655 | - |
| 4b.1.2.64 | Unit Coolers | - | 23 | - | - | - | - | - | 3 | 26 | - | - | 26 | - | - | - | - | - | - | 332 | - |
| 4b.1.2.65 | Unit Coolers - RCA | - | 56 | 0 | 2 | 39 | - | - | 20 | 117 | 117 | - | - | 232 | - | - | - | - | 9,413 | 690 | - |
| 4b.1.2.66 | Waste Gas Disposal | - | 438 | 43 | 45 | 410 | 464 | - | 298 | 1,699 | 1,699 | - | - | 2,453 | 1,358 | - | - | - | 187,339 | 5,879 | - |
| 4b.1.2.67 | Waste Liquid Disposal | - | 1,642 | 116 | 100 | 612 | 1,234 | - | 837 | 4,541 | 4,541 | - | - | 3,655 | 3,594 | - | - | - | 381,754 | 22,011 | - |
| 4b.1.2.68 | Waste Solid Disposal | - | 132 | 12 | 11 | 65 | 134 | - | 79 | 433 | 433 | - | - | 389 | 393 | - | - | - | 41,177 | 1,781 | - |
| 4b.1.2 | Totals | - | 17,877 | 633 | 1,092 | 17,625 | 5,377 | - | 8,385 | 50,989 | 47,545 | - | 3,444 | 105,339 | 15,761 | - | - | - | 5,294,310 | 240,033 | - |
| 4b.1.3 | Scaffolding in support of decommissioning | - | 4,297 | 33 | 15 | 281 | 45 | - | 1,133 | 5,804 | 5,804 | - | - | 1,518 | 134 | - | - | - | 76,824 | 35,578 | - |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table H-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|---------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| Decontamination of Site Buildings | | | | | | | | | | | | | | | | | | | | | | |
| 4b.1.4.1 | Reactor | 1,096 | 2,528 | 240 | 1,236 | 373 | 7,080 | - | 3,215 | 15,768 | 15,768 | - | - | 2,230 | 67,331 | - | - | - | - | 3,286,725 | 45,740 | - |
| 4b.1.4.2 | Auxiliary | 1,168 | 375 | 23 | 117 | 177 | 648 | - | 886 | 3,395 | 3,395 | - | - | 1,060 | 6,118 | - | - | - | - | 332,495 | 21,235 | - |
| 4b.1.4.3 | Backwash Waste Receiving Tank | - | 25 | 3 | 17 | - | 97 | - | 33 | 175 | 175 | - | - | - | 929 | - | - | - | - | 43,896 | 266 | - |
| 4b.1.4.4 | Drum Transfer & Truck Loading Enclosure | 16 | 8 | 1 | 3 | 3 | 14 | - | 15 | 59 | 59 | - | - | 19 | 135 | - | - | - | - | 7,118 | 328 | - |
| 4b.1.4.5 | LLRW Storage Enclosure | 111 | 48 | 3 | 17 | 6 | 96 | - | 95 | 377 | 377 | - | - | 38 | 920 | - | - | - | - | 44,971 | 2,151 | - |
| 4b.1.4.6 | Radwaste | 50 | 21 | 1 | 8 | 7 | 43 | - | 43 | 174 | 174 | - | - | 42 | 412 | - | - | - | - | 21,136 | 964 | - |
| 4b.1.4.7 | Resin Disposal | 15 | 11 | 1 | 3 | 14 | 14 | - | 16 | 72 | 72 | - | - | 83 | 124 | - | - | - | - | 9,271 | 340 | - |
| 4b.1.4.8 | Fuel Handling of Aux Building | 924 | 1,015 | 13 | 45 | 404 | 195 | - | 833 | 3,430 | 3,430 | - | - | 2,417 | 1,652 | - | - | - | - | 177,755 | 27,145 | - |
| 4b.1.4 | Totals | 3,380 | 4,031 | 285 | 1,445 | 985 | 8,187 | - | 5,137 | 23,450 | 23,450 | - | - | 5,889 | 77,619 | - | - | - | - | 3,923,368 | 98,170 | - |
| 4b.1.5 | Prepare/submit License Termination Plan | - | - | - | - | - | - | 225 | 34 | 259 | 259 | - | - | - | - | - | - | - | - | - | - | 1,751 |
| 4b.1.6 | Receive NRC approval of termination plan | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 4b.1 | Subtotal Period 4b Activity Costs | 3,693 | 26,240 | 1,036 | 2,594 | 18,892 | 14,312 | 225 | 15,045 | 82,037 | 78,593 | - | 3,444 | 112,746 | 95,607 | - | - | - | - | 9,427,420 | 374,358 | 1,751 |
| Period 4b Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 4b.2.1 | License Termination Survey Planning | - | - | - | - | - | - | 1,037 | 311 | 1,348 | 1,348 | - | - | - | - | - | - | - | - | - | - | 6,240 |
| 4b.2.2 | Excavation of Underground Services | - | 1,175 | - | - | - | - | 225 | 328 | 1,728 | 1,728 | - | - | - | - | - | - | - | - | - | 7,411 | - |
| 4b.2.3 | Operational Equipment | - | - | 11 | 36 | 606 | - | - | 97 | 751 | 751 | - | - | 5,880 | - | - | - | - | - | 147,000 | 16 | - |
| 4b.2.4 | License Termination ISFSI | - | 24 | 81 | 435 | - | 2,532 | 1,375 | 1,112 | 5,560 | 5,560 | - | - | - | 9,355 | - | - | - | - | 1,123,457 | 3,762 | 5,460 |
| 4b.2 | Subtotal Period 4b Additional Costs | - | 1,199 | 93 | 471 | 606 | 2,532 | 2,638 | 1,848 | 9,387 | 9,387 | - | - | 5,880 | 9,355 | - | - | - | - | 1,270,457 | 11,189 | 11,700 |
| Period 4b Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 4b.3.1 | Process decommissioning water waste | 7 | - | 12 | 21 | - | 48 | - | 20 | 107 | 107 | - | - | - | 109 | - | - | - | - | 6,547 | 21 | - |
| 4b.3.3 | Small tool allowance | - | 443 | - | - | - | - | - | 66 | 509 | 509 | - | - | - | - | - | - | - | - | - | - | - |
| 4b.3.4 | Decommissioning Equipment Disposition | - | - | 130 | 67 | 1,112 | 178 | - | 234 | 1,722 | 1,722 | - | - | 6,000 | 529 | - | - | - | - | 303,608 | 147 | - |
| 4b.3 | Subtotal Period 4b Collateral Costs | 7 | 443 | 142 | 88 | 1,112 | 225 | 1 | 320 | 2,338 | 2,338 | - | - | 6,000 | 638 | - | - | - | - | 310,155 | 168 | - |
| Period 4b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 4b.4.1 | Decon supplies | 1,449 | - | - | - | - | - | - | 362 | 1,811 | 1,811 | - | - | - | - | - | - | - | - | - | - | - |
| 4b.4.2 | Insurance | - | - | - | - | - | - | 862 | 86 | 949 | 949 | - | - | - | - | - | - | - | - | - | - | - |
| 4b.4.3 | Property taxes | - | - | - | - | - | - | 3,404 | 340 | 3,745 | 3,745 | - | - | - | - | - | - | - | - | - | - | - |
| 4b.4.4 | Health physics supplies | - | 3,232 | - | - | - | - | - | 808 | 4,041 | 4,041 | - | - | - | - | - | - | - | - | - | - | - |
| 4b.4.5 | Heavy equipment rental | - | 4,577 | - | - | - | - | - | 687 | 5,263 | 5,263 | - | - | - | - | - | - | - | - | - | - | - |
| 4b.4.6 | Disposal of DAW generated | - | - | 116 | 47 | - | 482 | - | 139 | 784 | 784 | - | - | - | 5,849 | - | - | - | - | 116,984 | 191 | - |
| 4b.4.7 | Plant energy budget | - | - | - | - | - | - | 2,165 | 325 | 2,490 | 2,490 | - | - | - | - | - | - | - | - | - | - | - |
| 4b.4.8 | NRC Fees | - | - | - | - | - | - | 562 | 56 | 618 | 618 | - | - | - | - | - | - | - | - | - | - | - |
| 4b.4.9 | Fixed Overhead | - | - | - | - | - | - | 2,118 | 318 | 2,436 | 2,436 | - | - | - | - | - | - | - | - | - | - | - |
| 4b.4.10 | Liquid Radwaste Processing Equipment/Services | - | - | - | - | - | - | 757 | 113 | 870 | 870 | - | - | - | - | - | - | - | - | - | - | - |
| 4b.4.11 | Railroad Track Maintenance | - | - | - | - | - | - | 111 | 17 | 128 | 128 | - | - | - | - | - | - | - | - | - | - | - |
| 4b.4.12 | Remedial Actions Surveys | - | - | - | - | - | - | 1,995 | 299 | 2,294 | 2,294 | - | - | - | - | - | - | - | - | - | - | - |
| 4b.4.13 | Security Staff Cost | - | - | - | - | - | - | 7,811 | 1,172 | 8,983 | 8,983 | - | - | - | - | - | - | - | - | - | - | 115,753 |
| 4b.4.14 | DOC Staff Cost | - | - | - | - | - | - | 22,641 | 3,396 | 26,038 | 26,038 | - | - | - | - | - | - | - | - | - | - | 248,175 |
| 4b.4.15 | Utility Staff Cost | - | - | - | - | - | - | 27,954 | 4,193 | 32,147 | 32,147 | - | - | - | - | - | - | - | - | - | - | 437,085 |
| 4b.4 | Subtotal Period 4b Period-Dependent Costs | 1,449 | 7,809 | 116 | 47 | - | 482 | 70,383 | 12,312 | 92,598 | 92,598 | - | - | - | 5,849 | - | - | - | - | 116,984 | 191 | 801,014 |
| 4b.0 | TOTAL PERIOD 4b COST | 5,149 | 35,691 | 1,386 | 3,201 | 20,610 | 17,552 | 73,246 | 29,526 | 186,361 | 182,916 | - | 3,444 | 124,626 | 111,449 | - | - | - | - | 11,125,020 | 385,906 | 814,465 |
| PERIOD 4f - License Termination | | | | | | | | | | | | | | | | | | | | | | |
| Period 4f Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| 4f.1.1 | ORISE confirmatory survey | - | - | - | - | - | - | 166 | 50 | 216 | 216 | - | - | - | - | - | - | - | - | - | - | - |
| 4f.1.2 | Terminate license | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 4f.1 | Subtotal Period 4f Activity Costs | - | - | - | - | - | - | 166 | 50 | 216 | 216 | - | - | - | - | - | - | - | - | - | - | - |
| Period 4f Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 4f.2.1 | License Termination Survey | - | - | - | - | - | - | 7,041 | 2,112 | 9,154 | 9,154 | - | - | - | - | - | - | - | - | - | 100,895 | 3,120 |
| 4f.2 | Subtotal Period 4f Additional Costs | - | - | - | - | - | - | 7,041 | 2,112 | 9,154 | 9,154 | - | - | - | - | - | - | - | - | - | 100,895 | 3,120 |
| Period 4f Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 4f.3.1 | DOC staff relocation expenses | - | - | - | - | - | - | 1,264 | 190 | 1,454 | 1,454 | - | - | - | - | - | - | - | - | - | - | - |
| 4f.3 | Subtotal Period 4f Collateral Costs | - | - | - | - | - | - | 1,264 | 190 | 1,454 | 1,454 | - | - | - | - | - | - | - | - | - | - | - |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table H-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|---|---|--------------|---------------|-----------------|-----------------|---------------------------|---------------------|----------------|-------------------|----------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|---------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| Period 4f Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 4f.4.2 | Property taxes | - | - | - | - | - | - | 1,335 | 133 | 1,468 | 1,468 | - | - | - | - | - | - | - | - | - | - | - |
| 4f.4.3 | Health physics supplies | - | 709 | - | - | - | - | - | 177 | 886 | 886 | - | - | - | - | - | - | - | - | - | - | - |
| 4f.4.4 | Disposal of DAW generated | - | - | 7 | 3 | - | 27 | - | 8 | 45 | 45 | - | - | - | 332 | - | - | - | - | 6,649 | 11 | - |
| 4f.4.5 | Plant energy budget | - | - | - | - | - | - | 243 | 36 | 279 | 279 | - | - | - | - | - | - | - | - | - | - | - |
| 4f.4.6 | NRC Fees | - | - | - | - | - | - | 263 | 26 | 290 | 290 | - | - | - | - | - | - | - | - | - | - | - |
| 4f.4.7 | Fixed Overhead | - | - | - | - | - | - | 890 | 133 | 1,023 | 1,023 | - | - | - | - | - | - | - | - | - | - | - |
| 4f.4.8 | Railroad Track Maintenance | - | - | - | - | - | - | 47 | 7 | 54 | 54 | - | - | - | - | - | - | - | - | - | - | - |
| 4f.4.9 | Security Staff Cost | - | - | - | - | - | - | 805 | 121 | 926 | 926 | - | - | - | - | - | - | - | - | - | - | 11,668 |
| 4f.4.10 | DOC Staff Cost | - | - | - | - | - | - | 4,238 | 636 | 4,874 | 4,874 | - | - | - | - | - | - | - | - | - | - | 46,283 |
| 4f.4.11 | Utility Staff Cost | - | - | - | - | - | - | 3,772 | 566 | 4,338 | 4,338 | - | - | - | - | - | - | - | - | - | - | 56,395 |
| 4f.4 | Subtotal Period 4f Period-Dependent Costs | - | 709 | 7 | 3 | - | 27 | 11,593 | 1,844 | 14,182 | 14,182 | - | - | - | 332 | - | - | - | - | 6,649 | 11 | 114,346 |
| 4f.0 | TOTAL PERIOD 4f COST | - | 709 | 7 | 3 | - | 27 | 20,064 | 4,196 | 25,006 | 25,006 | - | - | - | 332 | - | - | - | - | 6,649 | 100,906 | 117,466 |
| PERIOD 4 TOTALS | | 5,395 | 66,681 | 17,237 | 6,768 | 27,115 | 45,248 | 146,144 | 68,152 | 382,741 | 376,336 | - | 6,405 | 166,102 | 145,174 | 125 | 673 | 1,773 | 15,537,650 | 677,209 | 1,529,086 | |
| PERIOD 5b - Site Restoration | | | | | | | | | | | | | | | | | | | | | | |
| Period 5b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Demolition of Remaining Site Buildings | | | | | | | | | | | | | | | | | | | | | | |
| 5b.1.1.1 | Reactor | - | 4,645 | - | - | - | - | - | 697 | 5,342 | - | - | 5,342 | - | - | - | - | - | - | - | 44,679 | - |
| 5b.1.1.2 | Auxiliary | - | 1,993 | - | - | - | - | - | 299 | 2,291 | - | - | 2,291 | - | - | - | - | - | - | - | 11,902 | - |
| 5b.1.1.3 | Condensate Storage Tank Foundation | - | 7 | - | - | - | - | - | 1 | 8 | - | - | 8 | - | - | - | - | - | - | - | 33 | - |
| 5b.1.1.4 | Construction Warehouse & Fab Shop | - | 130 | - | - | - | - | - | 19 | 149 | - | - | 149 | - | - | - | - | - | - | - | 1,405 | - |
| 5b.1.1.5 | D3/D4 Emergency Generator | - | 14 | - | - | - | - | - | 2 | 16 | - | - | 16 | - | - | - | - | - | - | - | 84 | - |
| 5b.1.1.6 | Drum Transfer & Truck Loading Enclosure | - | 20 | - | - | - | - | - | 3 | 24 | - | - | 24 | - | - | - | - | - | - | - | 221 | - |
| 5b.1.1.7 | Hydrogen House | - | 6 | - | - | - | - | - | 1 | 7 | - | - | 7 | - | - | - | - | - | - | - | 47 | - |
| 5b.1.1.8 | LLRW Storage Enclosure | - | 128 | - | - | - | - | - | 19 | 147 | - | - | 147 | - | - | - | - | - | - | - | 853 | - |
| 5b.1.1.9 | Misc Structures 2017 | - | 2,617 | - | - | - | - | - | 393 | 3,009 | - | - | 3,009 | - | - | - | - | - | - | - | 22,582 | - |
| 5b.1.1.10 | Radwaste | - | 176 | - | - | - | - | - | 26 | 202 | - | - | 202 | - | - | - | - | - | - | - | 1,400 | - |
| 5b.1.1.11 | Resin Disposal | - | 14 | - | - | - | - | - | 2 | 16 | - | - | 16 | - | - | - | - | - | - | - | 120 | - |
| 5b.1.1.12 | Structures below 3' below grade | - | 1,785 | - | - | - | - | - | 268 | 2,052 | - | - | 2,052 | - | - | - | - | - | - | - | 9,238 | - |
| 5b.1.1.13 | Sulfuric Acid Tank Enclosure | - | 3 | - | - | - | - | - | 0 | 4 | - | - | 4 | - | - | - | - | - | - | - | 35 | - |
| 5b.1.1.14 | Turbine | - | 2,140 | - | - | - | - | - | 321 | 2,461 | - | - | 2,461 | - | - | - | - | - | - | - | 21,997 | - |
| 5b.1.1.15 | Turbine Pedestal | - | 365 | - | - | - | - | - | 55 | 420 | - | - | 420 | - | - | - | - | - | - | - | 1,857 | - |
| 5b.1.1.16 | Warehouse #2 | - | 24 | - | - | - | - | - | 4 | 27 | - | - | 27 | - | - | - | - | - | - | - | 213 | - |
| 5b.1.1.17 | Waste Neutralizing Tank House | - | 7 | - | - | - | - | - | 1 | 8 | - | - | 8 | - | - | - | - | - | - | - | 56 | - |
| 5b.1.1.18 | Waste Oil Storage | - | 9 | - | - | - | - | - | 1 | 10 | - | - | 10 | - | - | - | - | - | - | - | 70 | - |
| 5b.1.1.19 | Water Treatment | - | 324 | - | - | - | - | - | 49 | 373 | - | - | 373 | - | - | - | - | - | - | - | 2,690 | - |
| 5b.1.1.20 | Fuel Handling of Aux Building | - | 1,095 | - | - | - | - | - | 164 | 1,259 | - | - | 1,259 | - | - | - | - | - | - | - | 8,240 | - |
| 5b.1.1 | Totals | - | 15,501 | - | - | - | - | - | 2,325 | 17,826 | - | - | 17,826 | - | - | - | - | - | - | - | 127,723 | - |
| Site Closeout Activities | | | | | | | | | | | | | | | | | | | | | | |
| 5b.1.2 | Remove Rubble | - | 1,517 | - | - | - | - | - | 228 | 1,745 | - | - | 1,745 | - | - | - | - | - | - | - | 7,408 | - |
| 5b.1.3 | Grade & landscape site | - | 448 | - | - | - | - | - | 67 | 515 | - | - | 515 | - | - | - | - | - | - | - | 921 | - |
| 5b.1.4 | Final report to NRC | - | - | - | - | - | - | 86 | 13 | 99 | 99 | - | - | - | - | - | - | - | - | - | - | 667 |
| 5b.1 | Subtotal Period 5b Activity Costs | - | 17,466 | - | - | - | - | 86 | 2,633 | 20,185 | 99 | - | 20,086 | - | - | - | - | - | - | - | 136,051 | 667 |
| Period 5b Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 5b.2.1 | Clean Concrete Disposal | - | 4,912 | - | - | - | - | 10 | 738 | 5,660 | - | - | 5,660 | - | - | - | - | - | - | - | 18,372 | - |
| 5b.2.2 | Intake Structure Cofferdam | - | 442 | - | - | - | - | - | 66 | 508 | - | - | 508 | - | - | - | - | - | - | - | 3,552 | - |
| 5b.2.3 | Construction Debris | - | - | - | - | - | - | 2,150 | 323 | 2,473 | - | - | 2,473 | - | - | - | - | - | - | - | - | - |
| 5b.2.4 | Backfill | - | 9,257 | - | - | - | - | - | 1,388 | 10,645 | - | - | 10,645 | - | - | - | - | - | - | - | 9,327 | - |
| 5b.2.5 | Demolition and Site Restoration of ISFSI | - | 515 | - | - | - | - | 68 | 87 | 670 | - | - | 670 | - | - | - | - | - | - | - | 2,219 | 80 |
| 5b.2 | Subtotal Period 5b Additional Costs | - | 15,125 | - | - | - | - | 2,227 | 2,603 | 19,955 | - | - | 19,955 | - | - | - | - | - | - | - | 33,470 | 80 |
| Period 5b Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 5b.3.1 | Small tool allowance | - | 216 | - | - | - | - | - | 32 | 249 | - | - | 249 | - | - | - | - | - | - | - | - | - |
| 5b.3 | Subtotal Period 5b Collateral Costs | - | 216 | - | - | - | - | - | 32 | 249 | - | - | 249 | - | - | - | - | - | - | - | - | - |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table H-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with 60 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|-----------------------------------|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|---------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| Period 5b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 5b.4.2 | Property taxes | - | - | - | - | - | - | 3,481 | 348 | 3,829 | - | - | 3,829 | - | - | - | - | - | - | - | - | - |
| 5b.4.3 | Heavy equipment rental | - | 7,144 | - | - | - | - | - | 1,072 | 8,215 | - | - | 8,215 | - | - | - | - | - | - | - | - | - |
| 5b.4.4 | Plant energy budget | - | - | - | - | - | - | 344 | 52 | 395 | - | - | 395 | - | - | - | - | - | - | - | - | - |
| 5b.4.5 | Fixed Overhead | - | - | - | - | - | - | 1,024 | 154 | 1,178 | - | - | 1,178 | - | - | - | - | - | - | - | - | - |
| 5b.4.6 | Railroad Track Maintenance | - | - | - | - | - | - | 133 | 20 | 152 | - | - | 152 | - | - | - | - | - | - | - | - | - |
| 5b.4.7 | Security Staff Cost | - | - | - | - | - | - | 2,055 | 308 | 2,363 | - | - | 2,363 | - | - | - | - | - | - | - | - | 29,221 |
| 5b.4.8 | DOC Staff Cost | - | - | - | - | - | - | 10,921 | 1,638 | 12,559 | - | - | 12,559 | - | - | - | - | - | - | - | - | 116,885 |
| 5b.4.9 | Utility Staff Cost | - | - | - | - | - | - | 3,831 | 575 | 4,406 | - | - | 4,406 | - | - | - | - | - | - | - | - | 57,340 |
| 5b.4 | Subtotal Period 5b Period-Dependent Costs | - | 7,144 | - | - | - | - | 21,789 | 4,166 | 33,099 | - | - | 33,099 | - | - | - | - | - | - | - | - | 203,445 |
| 5b.0 | TOTAL PERIOD 5b COST | - | 39,951 | - | - | - | - | 24,102 | 9,434 | 73,487 | 99 | - | 73,389 | - | - | - | - | - | - | - | 169,521 | 204,192 |
| PERIOD 5 TOTALS | | - | 39,951 | - | - | - | - | 24,102 | 9,434 | 73,487 | 99 | - | 73,389 | - | - | - | - | - | - | - | 169,521 | 204,192 |
| TOTAL COST TO DECOMMISSION | | 12,732 | 121,684 | 17,878 | 7,311 | 27,293 | 47,788 | 911,654 | 176,962 | 1,323,304 | 952,576 | 290,238 | 80,490 | 172,234 | 166,987 | 125 | 673 | 1,773 | 16,284,880 | 947,658 | 5,801,223 | |

| | | |
|--|--------------------|----------------------------------|
| TOTAL COST TO DECOMMISSION WITH 15.44% CONTINGENCY: | \$1,323,304 | thousands of 2020 dollars |
| TOTAL NRC LICENSE TERMINATION COST IS 71.98% OR: | \$952,576 | thousands of 2020 dollars |
| SPENT FUEL MANAGEMENT COST IS 21.93% OR: | \$290,238 | thousands of 2020 dollars |
| NON-NUCLEAR DEMOLITION COST IS 6.08% OR: | \$80,490 | thousands of 2020 dollars |
| TOTAL LOW-LEVEL RADIOACTIVE WASTE VOLUME BURIED (EXCLUDING GTCC): | 167,785 | Cubic Feet |
| TOTAL GREATER THAN CLASS C RADWASTE VOLUME GENERATED: | 1,773 | Cubic Feet |
| TOTAL SCRAP METAL REMOVED: | 42,406 | Tons |
| TOTAL CRAFT LABOR REQUIREMENTS: | 947,658 | Man-hours |

End Notes:
n/a - indicates that this activity not charged as decommissioning expense
a - indicates that this activity performed by decommissioning staff
0 - indicates that this value is less than 0.5 but is non-zero
A cell containing " - " indicates a zero value

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Decommissioning Cost Analysis***

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APPENDIX I

DETAILED COST ANALYSIS

SCENARIO 7: SAFSTOR with 100 Year DFS

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| Prairie Island Nuclear Generating Plant, Unit 1 | I-2 |
| Prairie Island Nuclear Generating Plant, Unit 2 | I-14 |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table I-1
Prairie Island SAFSTOR Unit 1
SAFSTOR Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|--|--|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| PERIOD 1a - Shutdown through Transition | | | | | | | | | | | | | | | | | | | | | |
| Period 1a Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| 1a.1.1 | SAFSTOR site characterization survey | - | - | - | - | - | - | 415 | 124 | 539 | 539 | - | - | - | - | - | - | - | - | - | - |
| 1a.1.2 | Prepare preliminary decommissioning cost | - | - | - | - | - | - | 167 | 25 | 192 | 192 | - | - | - | - | - | - | - | - | - | 1,300 |
| 1a.1.3 | Notification of Cessation of Operations | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.4 | Remove fuel & source material | - | - | - | - | - | - | - | - | n/a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.5 | Notification of Permanent Defueling | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.6 | Deactivate plant systems & process waste | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.7 | Prepare and submit PSDAR | - | - | - | - | - | - | 257 | 39 | 296 | 296 | - | - | - | - | - | - | - | - | - | 2,000 |
| 1a.1.8 | Review plant dwgs & specs. | - | - | - | - | - | - | 167 | 25 | 192 | 192 | - | - | - | - | - | - | - | - | - | 1,300 |
| 1a.1.9 | Perform detailed rad survey | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.10 | Estimate by-product inventory | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| 1a.1.11 | End product description | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| 1a.1.12 | Detailed by-product inventory | - | - | - | - | - | - | 193 | 29 | 222 | 222 | - | - | - | - | - | - | - | - | - | 1,500 |
| 1a.1.13 | Define major work sequence | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| 1a.1.14 | Perform SER and EA | - | - | - | - | - | - | 398 | 60 | 458 | 458 | - | - | - | - | - | - | - | - | - | 3,100 |
| 1a.1.15 | Prepare/submit Defueled Technical Specifications | - | - | - | - | - | - | 964 | 145 | 1,108 | 1,108 | - | - | - | - | - | - | - | - | - | 7,500 |
| 1a.1.16 | Perform Site-Specific Cost Study | - | - | - | - | - | - | 643 | 96 | 739 | 739 | - | - | - | - | - | - | - | - | - | 5,000 |
| 1a.1.17 | Prepare/submit Irradiated Fuel Management Plan | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| Activity Specifications | | | | | | | | | | | | | | | | | | | | | |
| 1a.1.18.1 | Prepare plant and facilities for SAFSTOR | - | - | - | - | - | - | 632 | 95 | 727 | 727 | - | - | - | - | - | - | - | - | - | 4,920 |
| 1a.1.18.2 | Plant systems | - | - | - | - | - | - | 536 | 80 | 616 | 616 | - | - | - | - | - | - | - | - | - | 4,167 |
| 1a.1.18.3 | Plant structures and buildings | - | - | - | - | - | - | 401 | 60 | 461 | 461 | - | - | - | - | - | - | - | - | - | 3,120 |
| 1a.1.18.4 | Waste management | - | - | - | - | - | - | 257 | 39 | 296 | 296 | - | - | - | - | - | - | - | - | - | 2,000 |
| 1a.1.18.5 | Facility and site dormancy | - | - | - | - | - | - | 257 | 39 | 296 | 296 | - | - | - | - | - | - | - | - | - | 2,000 |
| 1a.1.18 | Total | - | - | - | - | - | - | 2,083 | 312 | 2,395 | 2,395 | - | - | - | - | - | - | - | - | - | 16,207 |
| Detailed Work Procedures | | | | | | | | | | | | | | | | | | | | | |
| 1a.1.19.1 | Plant systems | - | - | - | - | - | - | 152 | 23 | 175 | 175 | - | - | - | - | - | - | - | - | - | 1,183 |
| 1a.1.19.2 | Facility closeout & dormancy | - | - | - | - | - | - | 154 | 23 | 177 | 177 | - | - | - | - | - | - | - | - | - | 1,200 |
| 1a.1.19 | Total | - | - | - | - | - | - | 306 | 46 | 352 | 352 | - | - | - | - | - | - | - | - | - | 2,383 |
| 1a.1.20 | Procure vacuum drying system | - | - | - | - | - | - | 13 | 2 | 15 | 15 | - | - | - | - | - | - | - | - | - | 100 |
| 1a.1.21 | Drain/de-energize non-cont. systems | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.22 | Drain & dry NSSS | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.23 | Drain/de-energize contaminated systems | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.24 | Decon/secure contaminated systems | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1 | Subtotal Period 1a Activity Costs | - | - | - | - | - | - | 6,120 | 980 | 7,100 | 7,100 | - | - | - | - | - | - | - | - | - | 44,390 |
| Period 1a Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 1a.3.1 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 1,249 | - | 1,249 | - | 1,249 | - | - | - | - | - | - | - | - | - |
| 1a.3 | Subtotal Period 1a Collateral Costs | - | - | - | - | - | - | 1,249 | - | 1,249 | - | 1,249 | - | - | - | - | - | - | - | - | - |
| Period 1a Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 1a.4.1 | Insurance | - | - | - | - | - | - | 1,660 | 166 | 1,826 | 1,826 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.2 | Property taxes | - | - | - | - | - | - | 3,623 | 362 | 3,985 | 3,985 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.3 | Health physics supplies | - | 614 | - | - | - | - | - | 153 | 767 | 767 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.4 | Heavy equipment rental | - | 753 | - | - | - | - | - | 113 | 866 | 866 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.5 | Disposal of DAW generated | - | - | 12 | 5 | - | 50 | - | 14 | 82 | 82 | - | - | 610 | - | - | - | - | 12,190 | 20 | - |
| 1a.4.6 | Plant energy budget | - | - | - | - | - | - | 1,621 | 243 | 1,864 | 1,864 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.7 | NRC Fees | - | - | - | - | - | - | 892 | 89 | 981 | 981 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.8 | Emergency Planning Fees | - | - | - | - | - | - | 2,174 | 217 | 2,392 | - | 2,392 | - | - | - | - | - | - | - | - | - |
| 1a.4.9 | Fixed Overhead | - | - | - | - | - | - | 1,440 | 216 | 1,656 | 1,656 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.10 | Spent Fuel Pool O&M | - | - | - | - | - | - | 422 | 63 | 486 | - | 486 | - | - | - | - | - | - | - | - | - |
| 1a.4.11 | ISFSI Operating Costs | - | - | - | - | - | - | 56 | 8 | 64 | - | 64 | - | - | - | - | - | - | - | - | - |
| 1a.4.12 | Railroad Track Maintenance | - | - | - | - | - | - | 63 | 9 | 72 | - | 72 | - | - | - | - | - | - | - | - | - |
| 1a.4.13 | Security Staff Cost | - | - | - | - | - | - | 8,328 | 1,249 | 9,577 | 9,577 | - | - | - | - | - | - | - | - | - | 122,720 |
| 1a.4.14 | Utility Staff Cost | - | - | - | - | - | - | 26,931 | 4,040 | 30,971 | 30,971 | - | - | - | - | - | - | - | - | - | 422,240 |
| 1a.4 | Subtotal Period 1a Period-Dependent Costs | - | 1,367 | 12 | 5 | - | 50 | 47,211 | 6,945 | 55,590 | 52,648 | 2,942 | - | 610 | - | - | - | - | 12,190 | 20 | 544,960 |
| 1a.0 | TOTAL PERIOD 1a COST | - | 1,367 | 12 | 5 | - | 50 | 54,580 | 7,925 | 63,939 | 59,748 | 4,191 | - | 610 | - | - | - | - | 12,190 | 20 | 589,350 |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table I-1
Prairie Island SAFSTOR Unit 1
SAFSTOR Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|--|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|---------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| PERIOD 1b - SAFSTOR Limited DECON Activities | | | | | | | | | | | | | | | | | | | | | | |
| Period 1b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Decontamination of Site Buildings | | | | | | | | | | | | | | | | | | | | | | |
| 1b.1.1.1 | Reactor | 1,199 | - | - | - | - | - | - | 599 | 1,798 | 1,798 | - | - | - | - | - | - | - | - | - | 17,003 | - |
| 1b.1.1 | Totals | 1,199 | - | - | - | - | - | - | 599 | 1,798 | 1,798 | - | - | - | - | - | - | - | - | - | 17,003 | - |
| 1b.1 | Subtotal Period 1b Activity Costs | 1,199 | - | - | - | - | - | - | 599 | 1,798 | 1,798 | - | - | - | - | - | - | - | - | - | 17,003 | - |
| Period 1b Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 1b.2.1 | Spent Fuel Pool Isolation | - | - | - | - | - | - | 12,675 | 1,901 | 14,576 | 14,576 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.2 | Subtotal Period 1b Additional Costs | - | - | - | - | - | - | 12,675 | 1,901 | 14,576 | 14,576 | - | - | - | - | - | - | - | - | - | - | - |
| Period 1b Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 1b.3.1 | Decon equipment | 1,055 | - | - | - | - | - | - | 158 | 1,213 | 1,213 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.3.2 | Process decommissioning water waste | 79 | - | 52 | 94 | - | 212 | - | 112 | 549 | 549 | - | - | - | 487 | - | - | - | - | 29,193 | 95 | - |
| 1b.3.4 | Small tool allowance | - | 20 | - | - | - | - | - | 3 | 23 | 23 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.3.5 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 311 | - | 311 | - | 311 | - | - | - | - | - | - | - | - | - | - |
| 1b.3 | Subtotal Period 1b Collateral Costs | 1,134 | 20 | 52 | 94 | - | 212 | 311 | 273 | 2,097 | 1,785 | 311 | - | - | 487 | - | - | - | - | 29,193 | 95 | - |
| Period 1b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 1b.4.1 | Decon supplies | 449 | - | - | - | - | - | - | 112 | 561 | 561 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.2 | Insurance | - | - | - | - | - | - | 414 | 41 | 455 | 455 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.3 | Property taxes | - | - | - | - | - | - | 903 | 90 | 994 | 994 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.4 | Health physics supplies | - | 250 | - | - | - | - | - | 63 | 313 | 313 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.5 | Heavy equipment rental | - | 188 | - | - | - | - | - | 28 | 216 | 216 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.6 | Disposal of DAW generated | - | - | 6 | 3 | - | 27 | - | 8 | 43 | 43 | - | - | - | 324 | - | - | - | - | 6,486 | 11 | - |
| 1b.4.7 | Plant energy budget | - | - | - | - | - | - | 404 | 61 | 465 | 465 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.8 | NRC Fees | - | - | - | - | - | - | 161 | 16 | 177 | 177 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.9 | Emergency Planning Fees | - | - | - | - | - | - | 542 | 54 | 596 | - | 596 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.10 | Fixed Overhead | - | - | - | - | - | - | 359 | 54 | 413 | 413 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.11 | Spent Fuel Pool O&M | - | - | - | - | - | - | 105 | 16 | 121 | - | 121 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.12 | ISFSI Operating Costs | - | - | - | - | - | - | 14 | 2 | 16 | - | 16 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.13 | Railroad Track Maintenance | - | - | - | - | - | - | 16 | 2 | 18 | 18 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.14 | Security Staff Cost | - | - | - | - | - | - | 2,076 | 311 | 2,388 | 2,388 | - | - | - | - | - | - | - | - | - | - | 30,596 |
| 1b.4.15 | Utility Staff Cost | - | - | - | - | - | - | 6,714 | 1,007 | 7,722 | 7,722 | - | - | - | - | - | - | - | - | - | - | 105,271 |
| 1b.4 | Subtotal Period 1b Period-Dependent Costs | 449 | 438 | 6 | 3 | - | 27 | 11,709 | 1,866 | 14,498 | 13,764 | 733 | - | - | 324 | - | - | - | - | 6,486 | 11 | 135,867 |
| 1b.0 | TOTAL PERIOD 1b COST | 2,781 | 458 | 59 | 97 | - | 239 | 24,696 | 4,640 | 32,969 | 31,924 | 1,045 | - | - | 811 | - | - | - | - | 35,678 | 17,108 | 135,867 |
| PERIOD 1c - Preparations for SAFSTOR Dormancy | | | | | | | | | | | | | | | | | | | | | | |
| Period 1c Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| 1c.1.1 | Prepare support equipment for storage | - | 527 | - | - | - | - | - | 79 | 606 | 606 | - | - | - | - | - | - | - | - | - | 3,000 | - |
| 1c.1.2 | Install containment pressure equal. lines | - | 54 | - | - | - | - | - | 8 | 62 | 62 | - | - | - | - | - | - | - | - | - | 700 | - |
| 1c.1.3 | Interim survey prior to dormancy | - | - | - | - | - | - | 733 | 220 | 953 | 953 | - | - | - | - | - | - | - | - | - | 12,801 | - |
| 1c.1.4 | Secure building accesses | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - | - |
| 1c.1.5 | Prepare & submit interim report | - | - | - | - | - | - | 75 | 11 | 86 | 86 | - | - | - | - | - | - | - | - | - | - | 583 |
| 1c.1 | Subtotal Period 1c Activity Costs | - | 581 | - | - | - | - | 808 | 318 | 1,707 | 1,707 | - | - | - | - | - | - | - | - | - | 16,501 | 583 |
| Period 1c Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 1c.3.1 | Process decommissioning water waste | 91 | - | 60 | 109 | - | 245 | - | 129 | 634 | 634 | - | - | - | 561 | - | - | - | - | 33,685 | 109 | - |
| 1c.3.3 | Small tool allowance | - | 5 | - | - | - | - | - | 1 | 6 | 6 | - | - | - | - | - | - | - | - | - | - | - |
| 1c.3.4 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 163 | 25 | 188 | - | 188 | - | - | - | - | - | - | - | - | - | - |
| 1c.3.5 | Retention and Severance | - | - | - | - | - | - | 1,032 | 155 | 1,187 | 1,187 | - | - | - | - | - | - | - | - | - | - | - |
| 1c.3.6 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 311 | - | 311 | - | 311 | - | - | - | - | - | - | - | - | - | - |
| 1c.3 | Subtotal Period 1c Collateral Costs | 91 | 5 | 60 | 109 | - | 245 | 1,507 | 309 | 2,325 | 1,826 | 499 | - | - | 561 | - | - | - | - | 33,685 | 109 | - |
| Period 1c Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 1c.4.1 | Insurance | - | - | - | - | - | - | 414 | 41 | 455 | 455 | - | - | - | - | - | - | - | - | - | - | - |
| 1c.4.2 | Property taxes | - | - | - | - | - | - | 903 | 90 | 994 | 994 | - | - | - | - | - | - | - | - | - | - | - |
| 1c.4.3 | Health physics supplies | - | 248 | - | - | - | - | - | 62 | 309 | 309 | - | - | - | - | - | - | - | - | - | - | - |
| 1c.4.4 | Heavy equipment rental | - | 188 | - | - | - | - | - | 28 | 216 | 216 | - | - | - | - | - | - | - | - | - | - | - |
| 1c.4.5 | Disposal of DAW generated | - | - | 3 | 1 | - | 13 | - | 4 | 20 | 20 | - | - | - | 152 | - | - | - | - | 3,039 | 5 | - |
| 1c.4.6 | Plant energy budget | - | - | - | - | - | - | 404 | 61 | 465 | 465 | - | - | - | - | - | - | - | - | - | - | - |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table I-1
Prairie Island SAFSTOR Unit 1
SAFSTOR Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|---|--------------|--------------|-----------------|-----------------|---------------------------|---------------------|---------------|-------------------|----------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| Period 1c Period-Dependent Costs (continued) | | | | | | | | | | | | | | | | | | | | | |
| 1c.4.7 | NRC Fees | - | - | - | - | - | - | 161 | 16 | 177 | 177 | - | - | - | - | - | - | - | - | - | - |
| 1c.4.8 | Emergency Planning Fees | - | - | - | - | - | - | 542 | 54 | 596 | - | 596 | - | - | - | - | - | - | - | - | - |
| 1c.4.9 | Fixed Overhead | - | - | - | - | - | - | 359 | 54 | 413 | 413 | - | - | - | - | - | - | - | - | - | - |
| 1c.4.10 | Spent Fuel Pool O&M | - | - | - | - | - | - | 105 | 16 | 121 | - | 121 | - | - | - | - | - | - | - | - | - |
| 1c.4.11 | ISFSI Operating Costs | - | - | - | - | - | - | 14 | 2 | 16 | - | 16 | - | - | - | - | - | - | - | - | - |
| 1c.4.12 | Railroad Track Maintenance | - | - | - | - | - | - | 16 | 2 | 18 | 18 | - | - | - | - | - | - | - | - | - | - |
| 1c.4.13 | Security Staff Cost | - | - | - | - | - | - | 2,076 | 311 | 2,388 | 2,388 | - | - | - | - | - | - | - | - | - | 30,596 |
| 1c.4.14 | Utility Staff Cost | - | - | - | - | - | - | 6,714 | 1,007 | 7,722 | 7,722 | - | - | - | - | - | - | - | - | - | 105,271 |
| 1c.4 | Subtotal Period 1c Period-Dependent Costs | - | 435 | 3 | 1 | - | 13 | 11,709 | 1,749 | 13,910 | 13,177 | 733 | - | - | 152 | - | - | - | 3,039 | 5 | 135,867 |
| 1c.0 | TOTAL PERIOD 1c COST | 91 | 1,021 | 63 | 110 | - | 257 | 14,024 | 2,376 | 17,943 | 16,710 | 1,233 | - | - | 713 | - | - | - | 36,724 | 16,615 | 136,450 |
| PERIOD 1 TOTALS | | 2,873 | 2,846 | 134 | 212 | - | 546 | 93,299 | 14,941 | 114,851 | 108,382 | 6,468 | - | - | 2,134 | - | - | - | 84,593 | 33,743 | 861,667 |
| PERIOD 2a - SAFSTOR Dormancy with Wet Spent Fuel Storage | | | | | | | | | | | | | | | | | | | | | |
| Period 2a Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| 2a.1.1 | Quarterly Inspection | - | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - |
| 2a.1.2 | Semi-annual environmental survey | - | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - |
| 2a.1.3 | Prepare reports | - | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - |
| 2a.1.4 | Bituminous roof replacement | - | - | - | - | - | - | 54 | 8 | 62 | 62 | - | - | - | - | - | - | - | - | - | - |
| 2a.1.5 | Maintenance supplies | - | - | - | - | - | - | 520 | 130 | 650 | 650 | - | - | - | - | - | - | - | - | - | - |
| 2a.1 | Subtotal Period 2a Activity Costs | - | - | - | - | - | - | 574 | 138 | 712 | 712 | - | - | - | - | - | - | - | - | - | - |
| Period 2a Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 2a.2.1 | Security Modifications | - | - | - | - | - | - | 4,348 | 652 | 5,000 | 5,000 | - | - | - | - | - | - | - | - | - | - |
| 2a.2 | Subtotal Period 2a Additional Costs | - | - | - | - | - | - | 4,348 | 652 | 5,000 | 5,000 | - | - | - | - | - | - | - | - | - | - |
| Period 2a Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 2a.3.1 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 66,237 | 9,936 | 76,173 | - | 76,173 | - | - | - | - | - | - | - | - | - |
| 2a.3.2 | Retention and Severance | - | - | - | - | - | - | 22,434 | 3,365 | 25,799 | 25,799 | - | - | - | - | - | - | - | - | - | - |
| 2a.3.3 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 4,654 | - | 4,654 | - | 4,654 | - | - | - | - | - | - | - | - | - |
| 2a.3 | Subtotal Period 2a Collateral Costs | - | - | - | - | - | - | 93,325 | 13,301 | 106,626 | 25,799 | 80,827 | - | - | - | - | - | - | - | - | - |
| Period 2a Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 2a.4.1 | Insurance | - | - | - | - | - | - | 1,804 | 180 | 1,985 | 1,985 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.2 | Property taxes | - | - | - | - | - | - | 13,489 | 1,349 | 14,838 | 14,838 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.3 | Health physics supplies | - | 801 | - | - | - | - | - | 200 | 1,001 | 1,001 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.4 | Disposal of DAW generated | - | - | 14 | 6 | - | 59 | - | 17 | 96 | 96 | - | - | 714 | - | - | - | - | 14,273 | 23 | - |
| 2a.4.5 | Plant energy budget | - | - | - | - | - | - | 1,208 | 181 | 1,389 | 1,389 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.6 | NRC Fees | - | - | - | - | - | - | 908 | 91 | 999 | 999 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.7 | Emergency Planning Fees | - | - | - | - | - | - | 6,924 | 692 | 7,616 | - | 7,616 | - | - | - | - | - | - | - | - | - |
| 2a.4.8 | Fixed Overhead | - | - | - | - | - | - | 4,432 | 665 | 5,097 | 5,097 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.9 | Spent Fuel Pool O&M | - | - | - | - | - | - | 1,573 | 236 | 1,809 | - | 1,809 | - | - | - | - | - | - | - | - | - |
| 2a.4.10 | ISFSI Operating Costs | - | - | - | - | - | - | 209 | 31 | 240 | - | 240 | - | - | - | - | - | - | - | - | - |
| 2a.4.11 | Railroad Track Maintenance | - | - | - | - | - | - | 462 | 69 | 531 | 531 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.12 | Security Staff Cost | - | - | - | - | - | - | 29,334 | 4,400 | 33,734 | 24,289 | 9,446 | - | - | - | - | - | - | - | - | 431,215 |
| 2a.4.13 | Utility Staff Cost | - | - | - | - | - | - | 3,645 | 547 | 4,192 | 3,517 | 675 | - | - | - | - | - | - | - | - | 58,126 |
| 2a.4 | Subtotal Period 2a Period-Dependent Costs | - | 801 | 14 | 6 | - | 59 | 63,988 | 8,659 | 73,527 | 53,741 | 19,786 | - | 714 | - | - | - | - | 14,273 | 23 | 489,341 |
| 2a.0 | TOTAL PERIOD 2a COST | - | 801 | 14 | 6 | - | 59 | 162,235 | 22,750 | 185,865 | 85,251 | 100,614 | - | 714 | - | - | - | - | 14,273 | 23 | 489,341 |
| PERIOD 2b - SAFSTOR Dormancy with Dry Spent Fuel Storage | | | | | | | | | | | | | | | | | | | | | |
| Period 2b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| 2b.1.1 | Quarterly Inspection | - | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - |
| 2b.1.2 | Semi-annual environmental survey | - | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - |
| 2b.1.3 | Prepare reports | - | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - |
| 2b.1.4 | Bituminous roof replacement | - | - | - | - | - | - | 704 | 106 | 810 | 810 | - | - | - | - | - | - | - | - | - | - |
| 2b.1.5 | Maintenance supplies | - | - | - | - | - | - | 6,792 | 1,698 | 8,490 | 8,490 | - | - | - | - | - | - | - | - | - | - |
| 2b.1 | Subtotal Period 2b Activity Costs | - | - | - | - | - | - | 7,496 | 1,804 | 9,300 | 9,300 | - | - | - | - | - | - | - | - | - | - |
| Period 2b Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 2b.3.1 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 122,995 | 18,449 | 141,444 | - | 141,444 | - | - | - | - | - | - | - | - | - |
| 2b.3.2 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 60,797 | - | 60,797 | - | 60,797 | - | - | - | - | - | - | - | - | - |
| 2b.3 | Subtotal Period 2b Collateral Costs | - | - | - | - | - | - | 183,792 | 18,449 | 202,241 | - | 202,241 | - | - | - | - | - | - | - | - | - |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table I-1
Prairie Island SAFSTOR Unit 1
SAFSTOR Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|-----------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| Period 2b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 2b.4.1 | Insurance | - | - | - | - | - | - | 23,569 | 2,357 | 25,926 | 25,926 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.2 | Property taxes | - | - | - | - | - | - | 176,207 | 17,621 | 193,828 | 193,828 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.3 | Health physics supplies | - | 5,528 | - | - | - | - | - | 1,382 | 6,910 | 6,910 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.4 | Disposal of DAW generated | - | - | 100 | 40 | - | 414 | - | 120 | 674 | 674 | - | - | - | 5,027 | - | - | - | - | 100,550 | 164 | - |
| 2b.4.5 | Plant energy budget | - | - | - | - | - | - | 7,891 | 1,184 | 9,075 | 9,075 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.6 | NRC Fees | - | - | - | - | - | - | 11,071 | 1,107 | 12,178 | 12,178 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.7 | Emergency Planning Fees | - | - | - | - | - | - | 3,608 | 361 | 3,969 | - | 3,969 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.8 | Fixed Overhead | - | - | - | - | - | - | 7,930 | 1,190 | 9,120 | 9,120 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.9 | ISFSI Operating Costs | - | - | - | - | - | - | 2,724 | 409 | 3,132 | - | 3,132 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.10 | Railroad Track Maintenance | - | - | - | - | - | - | 3,043 | 456 | 3,499 | 3,499 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.11 | Security Staff Cost | - | - | - | - | - | - | 135,841 | 20,376 | 156,217 | 34,368 | 121,849 | - | - | - | - | - | - | - | - | - | 1,822,251 |
| 2b.4.12 | Utility Staff Cost | - | - | - | - | - | - | 66,470 | 9,970 | 76,440 | 48,005 | 28,436 | - | - | - | - | - | - | - | - | - | 1,012,362 |
| 2b.4 | Subtotal Period 2b Period-Dependent Costs | - | 5,528 | 100 | 40 | - | 414 | 438,354 | 56,532 | 500,968 | 343,582 | 157,386 | - | - | 5,027 | - | - | - | - | 100,550 | 164 | 2,834,613 |
| 2b.0 | TOTAL PERIOD 2b COST | - | 5,528 | 100 | 40 | - | 414 | 629,642 | 76,785 | 712,510 | 352,882 | 359,628 | - | - | 5,027 | - | - | - | - | 100,550 | 164 | 2,834,613 |
| PERIOD 2 TOTALS | | - | 6,329 | 114 | 46 | - | 473 | 791,877 | 99,535 | 898,374 | 438,133 | 460,241 | - | - | 5,741 | - | - | - | - | 114,823 | 187 | 3,323,954 |
| PERIOD 3a - Reactivate Site Following SAFSTOR Dormancy | | | | | | | | | | | | | | | | | | | | | | |
| Period 3a Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| 3a.1.1 | Prepare preliminary decommissioning cost | - | - | - | - | - | - | 167 | 25 | 192 | 192 | - | - | - | - | - | - | - | - | - | - | 1,300 |
| 3a.1.2 | Review plant dwgs & specs. | - | - | - | - | - | - | 591 | 89 | 680 | 680 | - | - | - | - | - | - | - | - | - | - | 4,600 |
| 3a.1.3 | Perform detailed rad survey | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - | - |
| 3a.1.4 | End product description | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | - | 1,000 |
| 3a.1.5 | Detailed by-product inventory | - | - | - | - | - | - | 167 | 25 | 192 | 192 | - | - | - | - | - | - | - | - | - | - | 1,300 |
| 3a.1.6 | Define major work sequence | - | - | - | - | - | - | 964 | 145 | 1,108 | 1,108 | - | - | - | - | - | - | - | - | - | - | 7,500 |
| 3a.1.7 | Perform SER and EA | - | - | - | - | - | - | 398 | 60 | 458 | 458 | - | - | - | - | - | - | - | - | - | - | 3,100 |
| 3a.1.8 | Perform Site-Specific Cost Study | - | - | - | - | - | - | 643 | 96 | 739 | 739 | - | - | - | - | - | - | - | - | - | - | 5,000 |
| Activity Specifications | | | | | | | | | | | | | | | | | | | | | | |
| 3a.1.9.1 | Re-activate plant & temporary facilities | - | - | - | - | - | - | 947 | 142 | 1,089 | 980 | - | 109 | - | - | - | - | - | - | - | - | 7,370 |
| 3a.1.9.2 | Plant systems | - | - | - | - | - | - | 536 | 80 | 616 | 554 | - | 62 | - | - | - | - | - | - | - | - | 4,167 |
| 3a.1.9.3 | Reactor internals | - | - | - | - | - | - | 912 | 137 | 1,049 | 1,049 | - | - | - | - | - | - | - | - | - | - | 7,100 |
| 3a.1.9.4 | Reactor vessel | - | - | - | - | - | - | 835 | 125 | 961 | 961 | - | - | - | - | - | - | - | - | - | - | 6,500 |
| 3a.1.9.5 | Biological shield | - | - | - | - | - | - | 64 | 10 | 74 | 74 | - | - | - | - | - | - | - | - | - | - | 500 |
| 3a.1.9.6 | Steam generators | - | - | - | - | - | - | 401 | 60 | 461 | 461 | - | - | - | - | - | - | - | - | - | - | 3,120 |
| 3a.1.9.7 | Reinforced concrete | - | - | - | - | - | - | 206 | 31 | 236 | 118 | - | 118 | - | - | - | - | - | - | - | - | 1,600 |
| 3a.1.9.8 | Main Turbine | - | - | - | - | - | - | 51 | 8 | 59 | - | - | 59 | - | - | - | - | - | - | - | - | 400 |
| 3a.1.9.9 | Main Condensers | - | - | - | - | - | - | 51 | 8 | 59 | - | - | 59 | - | - | - | - | - | - | - | - | 400 |
| 3a.1.9.10 | Plant structures & buildings | - | - | - | - | - | - | 401 | 60 | 461 | 231 | - | 231 | - | - | - | - | - | - | - | - | 3,120 |
| 3a.1.9.11 | Waste management | - | - | - | - | - | - | 591 | 89 | 680 | 680 | - | - | - | - | - | - | - | - | - | - | 4,600 |
| 3a.1.9.12 | Facility & site closeout | - | - | - | - | - | - | 116 | 17 | 133 | 67 | - | 67 | - | - | - | - | - | - | - | - | 900 |
| 3a.1.9 | Total | - | - | - | - | - | - | 5,112 | 767 | 5,879 | 5,175 | - | 704 | - | - | - | - | - | - | - | - | 39,777 |
| Planning & Site Preparations | | | | | | | | | | | | | | | | | | | | | | |
| 3a.1.10 | Prepare dismantling sequence | - | - | - | - | - | - | 308 | 46 | 355 | 355 | - | - | - | - | - | - | - | - | - | - | 2,400 |
| 3a.1.11 | Plant prep. & temp. svces | - | - | - | - | - | - | 3,500 | 525 | 4,025 | 4,025 | - | - | - | - | - | - | - | - | - | - | - |
| 3a.1.12 | Design water clean-up system | - | - | - | - | - | - | 180 | 27 | 207 | 207 | - | - | - | - | - | - | - | - | - | - | 1,400 |
| 3a.1.13 | Rigging/Cont. Cntrl Envlps/tooling/etc. | - | - | - | - | - | - | 2,400 | 360 | 2,760 | 2,760 | - | - | - | - | - | - | - | - | - | - | - |
| 3a.1.14 | Procure casks/liners & containers | - | - | - | - | - | - | 158 | 24 | 182 | 182 | - | - | - | - | - | - | - | - | - | - | 1,230 |
| 3a.1 | Subtotal Period 3a Activity Costs | - | - | - | - | - | - | 14,717 | 2,208 | 16,925 | 16,221 | - | 704 | - | - | - | - | - | - | - | - | 68,607 |
| Period 3a Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3a.2.1 | Site Characterization | - | - | - | - | - | - | 3,520 | 1,056 | 4,576 | 4,576 | - | - | - | - | - | - | - | - | - | - | 21,020 |
| 3a.2.2 | Mixed/Hazardous Waste | - | - | 353 | 94 | 178 | - | - | 76 | 702 | 702 | - | - | 6,132 | - | - | - | - | - | 351,977 | 2,348 | - |
| 3a.2.3 | Asbestos Abatement | - | 2,526 | 3 | 150 | - | 1,369 | - | 996 | 5,044 | 5,044 | - | - | - | 12,843 | - | - | - | - | 166,959 | 20,907 | - |
| 3a.2 | Subtotal Period 3a Additional Costs | - | 2,526 | 356 | 244 | 178 | 1,369 | 3,520 | 2,129 | 10,321 | 10,321 | - | - | 6,132 | 12,843 | - | - | - | - | 518,936 | 44,275 | 8,332 |
| Period 3a Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3a.3.1 | Small tool allowance | - | 34 | - | - | - | - | - | 5 | 39 | 39 | - | - | - | - | - | - | - | - | - | - | - |
| 3a.3.2 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 24,367 | 3,655 | 28,022 | - | 28,022 | - | - | - | - | - | - | - | - | - | - |
| 3a.3.3 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 1,249 | - | 1,249 | - | 1,249 | - | - | - | - | - | - | - | - | - | - |
| 3a.3 | Subtotal Period 3a Collateral Costs | - | 34 | - | - | - | - | 25,616 | 3,660 | 29,310 | 39 | 29,271 | - | - | - | - | - | - | - | - | - | - |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table I-1
Prairie Island SAFSTOR Unit 1
SAFSTOR Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| Period 3a Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 3a.4.1 | Insurance | - | - | - | - | - | - | 484 | 48 | 533 | 307 | 225 | - | - | - | - | - | - | - | - | - |
| 3a.4.2 | Property taxes | - | - | - | - | - | - | 3,618 | 362 | 3,980 | 2,551 | 1,429 | - | - | - | - | - | - | - | - | - |
| 3a.4.3 | Health physics supplies | - | 670 | - | - | - | - | - | 167 | 837 | 837 | - | - | - | - | - | - | - | - | - | - |
| 3a.4.4 | Heavy equipment rental | - | 753 | - | - | - | - | - | 113 | 866 | 866 | - | - | - | - | - | - | - | - | - | - |
| 3a.4.5 | Disposal of DAW generated | - | - | 10 | 4 | - | 42 | - | 12 | 69 | 69 | - | - | - | 516 | - | - | - | 10,311 | 17 | - |
| 3a.4.6 | Plant energy budget | - | - | - | - | - | - | 1,621 | 243 | 1,864 | 1,864 | - | - | - | - | - | - | - | - | - | - |
| 3a.4.7 | NRC ISFSI Fees | - | - | - | - | - | - | 120 | 12 | 132 | - | 132 | - | - | - | - | - | - | - | - | - |
| 3a.4.8 | NRC Fees | - | - | - | - | - | - | 335 | 33 | 368 | 368 | - | - | - | - | - | - | - | - | - | - |
| 3a.4.9 | Emergency Planning Fees | - | - | - | - | - | - | 74 | 7 | 82 | - | 82 | - | - | - | - | - | - | - | - | - |
| 3a.4.10 | Fixed Overhead | - | - | - | - | - | - | 1,440 | 216 | 1,656 | 1,656 | - | - | - | - | - | - | - | - | - | - |
| 3a.4.11 | ISFSI Operating Costs | - | - | - | - | - | - | 56 | 8 | 64 | - | 64 | - | - | - | - | - | - | - | - | - |
| 3a.4.12 | Railroad Track Maintenance | - | - | - | - | - | - | 63 | 9 | 72 | 72 | - | - | - | - | - | - | - | - | - | - |
| 3a.4.13 | Security Staff Cost | - | - | - | - | - | - | 4,632 | 695 | 5,327 | 5,044 | 282 | - | - | - | - | - | - | - | - | 69,160 |
| 3a.4.14 | Utility Staff Cost | - | - | - | - | - | - | 16,599 | 2,490 | 19,089 | 18,421 | 668 | - | - | - | - | - | - | - | - | 260,000 |
| 3a.4 | Subtotal Period 3a Period-Dependent Costs | - | 1,423 | 10 | 4 | - | 42 | 29,042 | 4,417 | 34,939 | 32,057 | 2,882 | - | - | 516 | - | - | - | 10,311 | 17 | 329,160 |
| 3a.0 | TOTAL PERIOD 3a COST | - | 3,983 | 366 | 248 | 178 | 1,412 | 72,895 | 12,414 | 91,495 | 58,638 | 32,153 | 704 | 6,132 | 13,359 | - | - | - | 529,247 | 44,292 | 406,099 |
| PERIOD 3b - Decommissioning Preparations | | | | | | | | | | | | | | | | | | | | | |
| Period 3b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| Detailed Work Procedures | | | | | | | | | | | | | | | | | | | | | |
| 3b.1.1.1 | Plant systems | - | - | - | - | - | - | 608 | 91 | 700 | 630 | - | 70 | - | - | - | - | - | - | - | 4,733 |
| 3b.1.1.2 | Reactor internals | - | - | - | - | - | - | 321 | 48 | 369 | 369 | - | - | - | - | - | - | - | - | - | 2,500 |
| 3b.1.1.3 | Remaining buildings | - | - | - | - | - | - | 174 | 26 | 200 | 50 | - | 150 | - | - | - | - | - | - | - | 1,350 |
| 3b.1.1.4 | CRD cooling assembly | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| 3b.1.1.5 | CRD housings & ICI tubes | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| 3b.1.1.6 | Incore instrumentation | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| 3b.1.1.7 | Reactor vessel | - | - | - | - | - | - | 467 | 70 | 537 | 537 | - | - | - | - | - | - | - | - | - | 3,630 |
| 3b.1.1.8 | Facility closeout | - | - | - | - | - | - | 154 | 23 | 177 | 89 | - | 89 | - | - | - | - | - | - | - | 1,200 |
| 3b.1.1.9 | Missile shields | - | - | - | - | - | - | 58 | 9 | 67 | 67 | - | - | - | - | - | - | - | - | - | 450 |
| 3b.1.1.10 | Biological shield | - | - | - | - | - | - | 154 | 23 | 177 | 177 | - | - | - | - | - | - | - | - | - | 1,200 |
| 3b.1.1.11 | Steam generators | - | - | - | - | - | - | 591 | 89 | 680 | 680 | - | - | - | - | - | - | - | - | - | 4,600 |
| 3b.1.1.12 | Reinforced concrete | - | - | - | - | - | - | 129 | 19 | 148 | 74 | - | 74 | - | - | - | - | - | - | - | 1,000 |
| 3b.1.1.13 | Main Turbine | - | - | - | - | - | - | 200 | 30 | 231 | - | - | 231 | - | - | - | - | - | - | - | 1,560 |
| 3b.1.1.14 | Main Condensers | - | - | - | - | - | - | 200 | 30 | 231 | - | - | 231 | - | - | - | - | - | - | - | 1,560 |
| 3b.1.1.15 | Auxiliary building | - | - | - | - | - | - | 351 | 53 | 403 | 363 | - | 40 | - | - | - | - | - | - | - | 2,730 |
| 3b.1.1.16 | Reactor building | - | - | - | - | - | - | 351 | 53 | 403 | 363 | - | 40 | - | - | - | - | - | - | - | 2,730 |
| 3b.1.1 | Total | - | - | - | - | - | - | 4,144 | 622 | 4,765 | 3,841 | - | 924 | - | - | - | - | - | - | - | 32,243 |
| 3b.1 | Subtotal Period 3b Activity Costs | - | - | - | - | - | - | 4,144 | 622 | 4,765 | 3,841 | - | 924 | - | - | - | - | - | - | - | 32,243 |
| Period 3b Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 3b.3.1 | Decon equipment | 1,055 | - | - | - | - | - | - | 158 | 1,213 | 1,213 | - | - | - | - | - | - | - | - | - | - |
| 3b.3.2 | DOC staff relocation expenses | - | - | - | - | - | - | 1,264 | 190 | 1,454 | 1,454 | - | - | - | - | - | - | - | - | - | - |
| 3b.3.3 | Pipe cutting equipment | - | 1,200 | - | - | - | - | - | 180 | 1,380 | 1,380 | - | - | - | - | - | - | - | - | - | - |
| 3b.3.4 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 26,241 | 3,936 | 30,177 | - | 30,177 | - | - | - | - | - | - | - | - | - |
| 3b.3.5 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 623 | - | 623 | - | 623 | - | - | - | - | - | - | - | - | - |
| 3b.3 | Subtotal Period 3b Collateral Costs | 1,055 | 1,200 | - | - | - | - | 28,128 | 4,464 | 34,846 | 4,047 | 30,800 | - | - | - | - | - | - | - | - | - |
| Period 3b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 3b.4.1 | Decon supplies | 38 | - | - | - | - | - | - | 9 | 47 | 47 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.2 | Insurance | - | - | - | - | - | - | 241 | 24 | 266 | 266 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.3 | Property taxes | - | - | - | - | - | - | 1,802 | 180 | 1,982 | 1,270 | 711 | - | - | - | - | - | - | - | - | - |
| 3b.4.4 | Health physics supplies | - | 295 | - | - | - | - | - | 74 | 369 | 369 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.5 | Heavy equipment rental | - | 375 | - | - | - | - | - | 56 | 432 | 432 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.6 | Disposal of DAW generated | - | - | 6 | 2 | - | 24 | - | 7 | 39 | 39 | - | - | - | 291 | - | - | - | 5,814 | 9 | - |
| 3b.4.7 | Plant energy budget | - | - | - | - | - | - | 808 | 121 | 930 | 930 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.8 | NRC ISFSI Fees | - | - | - | - | - | - | 60 | 6 | 66 | - | 66 | - | - | - | - | - | - | - | - | - |
| 3b.4.9 | NRC Fees | - | - | - | - | - | - | 167 | 17 | 183 | 183 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.10 | Emergency Planning Fees | - | - | - | - | - | - | 37 | 4 | 41 | - | 41 | - | - | - | - | - | - | - | - | - |
| 3b.4.11 | Fixed Overhead | - | - | - | - | - | - | 718 | 108 | 826 | 826 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.12 | ISFSI Operating Costs | - | - | - | - | - | - | 28 | 4 | 32 | - | 32 | - | - | - | - | - | - | - | - | - |
| 3b.4.13 | Railroad Track Maintenance | - | - | - | - | - | - | 31 | 5 | 36 | 36 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.14 | Security Staff Cost | - | - | - | - | - | - | 2,310 | 346 | 2,656 | 2,515 | 141 | - | - | - | - | - | - | - | - | 34,485 |
| 3b.4.15 | DOC Staff Cost | - | - | - | - | - | - | 5,344 | 802 | 6,146 | 6,146 | - | - | - | - | - | - | - | - | - | 58,080 |
| 3b.4.16 | Utility Staff Cost | - | - | - | - | - | - | 8,277 | 1,242 | 9,518 | 9,185 | 333 | - | - | - | - | - | - | - | - | 129,644 |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table I-1
Prairie Island SAFSTOR Unit 1
SAFSTOR Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|--|--|--------------|--------------|-----------------|-----------------|---------------------------|---------------------|----------------|-------------------|----------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| 3b.4 | Subtotal Period 3b Period-Dependent Costs | 38 | 671 | 6 | 2 | - | 24 | 19,823 | 3,005 | 23,568 | 22,244 | 1,324 | - | - | 291 | - | - | - | 5,814 | 9 | 222,210 |
| 3b.0 | TOTAL PERIOD 3b COST | 1,092 | 1,871 | 6 | 2 | - | 24 | 52,094 | 8,090 | 63,180 | 30,132 | 32,124 | 924 | - | 291 | - | - | - | 5,814 | 9 | 254,453 |
| PERIOD 3 TOTALS | | 1,092 | 5,853 | 372 | 251 | 178 | 1,436 | 124,989 | 20,504 | 154,675 | 88,770 | 64,276 | 1,628 | 6,132 | 13,649 | - | - | - | 535,061 | 44,301 | 660,551 |
| PERIOD 4a - Large Component Removal | | | | | | | | | | | | | | | | | | | | | |
| Period 4a Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| Nuclear Steam Supply System Removal | | | | | | | | | | | | | | | | | | | | | |
| 4a.1.1.1 | Reactor Coolant Piping | 11 | 42 | 10 | 11 | 66 | 94 | - | 52 | 285 | 285 | - | - | 240 | 254 | - | - | - | 33,680 | 778 | - |
| 4a.1.1.2 | Pressurizer Relief Tank | 5 | 19 | 6 | 7 | 44 | 62 | - | 31 | 174 | 174 | - | - | 160 | 169 | - | - | - | 22,441 | 352 | - |
| 4a.1.1.3 | Reactor Coolant Pumps & Motors | 13 | 60 | 46 | 85 | - | 463 | - | 155 | 822 | 822 | - | - | - | 2,332 | - | - | - | 295,800 | 1,226 | 80 |
| 4a.1.1.4 | Pressurizer | - | 77 | 382 | 91 | - | 776 | - | 265 | 1,591 | 1,591 | - | - | - | 2,196 | - | - | - | 158,199 | 1,346 | 750 |
| 4a.1.1.5 | Steam Generators | - | 3,307 | 1,690 | 1,743 | 2,409 | 3,885 | - | 2,590 | 15,625 | 15,625 | - | - | 18,672 | 10,990 | - | - | - | 1,581,180 | 10,253 | 2,250 |
| 4a.1.1.6 | CRDMs/ICIs/Service Structure Removal | 63 | 248 | 205 | 44 | 326 | 454 | - | 283 | 1,623 | 1,623 | - | - | 2,138 | 2,146 | - | - | - | 165,025 | 4,449 | - |
| 4a.1.1.7 | Reactor Vessel Internals | 53 | 4,650 | 13,334 | 828 | - | 8,610 | 278 | 11,401 | 39,153 | 39,153 | - | - | - | 1,174 | - | 742 | - | 167,605 | 22,373 | 1,053 |
| 4a.1.1.8 | Reactor Vessel | - | 5,835 | 1,653 | 442 | - | 3,268 | 278 | 6,576 | 18,053 | 18,053 | - | - | - | 9,245 | - | - | - | 579,324 | 22,373 | 1,053 |
| 4a.1.1 | Totals | 146 | 14,237 | 17,327 | 3,250 | 2,845 | 17,613 | 556 | 21,352 | 77,327 | 77,327 | - | - | 21,210 | 28,505 | - | 742 | - | 3,003,254 | 63,151 | 5,187 |
| Removal of Major Equipment | | | | | | | | | | | | | | | | | | | | | |
| 4a.1.2 | Main Turbine/Generator | - | 292 | 116 | 35 | 555 | - | - | 173 | 1,170 | 1,170 | - | - | 2,243 | - | - | - | - | 134,601 | 4,116 | - |
| 4a.1.3 | Main Condensers | - | 2,510 | 79 | 33 | 742 | - | - | 752 | 4,115 | 4,115 | - | - | 4,000 | - | - | - | - | 180,000 | 34,978 | - |
| Cascading Costs from Clean Building Demolition | | | | | | | | | | | | | | | | | | | | | |
| 4a.1.4.1 | Reactor | - | 794 | - | - | - | - | - | 119 | 913 | 913 | - | - | - | - | - | - | - | - | 7,589 | - |
| 4a.1.4 | Totals | - | 794 | - | - | - | - | - | 119 | 913 | 913 | - | - | - | - | - | - | - | - | 7,589 | - |
| Disposal of Plant Systems | | | | | | | | | | | | | | | | | | | | | |
| 4a.1.5.1 | Air Removal | - | 31 | - | - | - | - | - | 5 | 36 | - | - | 36 | - | - | - | - | - | - | 452 | - |
| 4a.1.5.2 | Auxiliary Feedwater | - | 46 | - | - | - | - | - | 7 | 53 | - | - | 53 | - | - | - | - | - | - | 670 | - |
| 4a.1.5.3 | Auxiliary Feedwater - RCA | - | 47 | 0 | 2 | 36 | - | - | 17 | 102 | 102 | - | - | 215 | - | - | - | - | 8,722 | 601 | - |
| 4a.1.5.4 | Bleed Steam | - | 90 | - | - | - | - | - | 14 | 104 | - | - | 104 | - | - | - | - | - | - | 1,335 | - |
| 4a.1.5.5 | Caustic Addition - RCA | - | 38 | 0 | 2 | 39 | - | - | 16 | 95 | 95 | - | - | 233 | - | - | - | - | 9,453 | 444 | - |
| 4a.1.5.6 | Chemical Feed | - | 20 | - | - | - | - | - | 3 | 23 | - | - | 23 | - | - | - | - | - | - | 304 | - |
| 4a.1.5.7 | Chemical Feed - RCA | - | 1 | 0 | 0 | 1 | - | - | 0 | 3 | 3 | - | - | 6 | - | - | - | - | 243 | 12 | - |
| 4a.1.5.8 | Circulating Water | - | 42 | - | - | - | - | - | 6 | 49 | - | - | 49 | - | - | - | - | - | - | 619 | - |
| 4a.1.5.9 | Condensate | - | 474 | - | - | - | - | - | 71 | 545 | - | - | 545 | - | - | - | - | - | - | 6,837 | - |
| 4a.1.5.10 | Condensate Polishing | - | 235 | - | - | - | - | - | 35 | 271 | - | - | 271 | - | - | - | - | - | - | 3,420 | - |
| 4a.1.5.11 | Condensate Polishing - RCA | - | 183 | 4 | 15 | 348 | - | - | 101 | 651 | 651 | - | - | 2,078 | - | - | - | - | 84,395 | 2,329 | - |
| 4a.1.5.12 | Electro-hydraulic | - | 9 | - | - | - | - | - | 1 | 10 | - | - | 10 | - | - | - | - | - | - | 127 | - |
| 4a.1.5.13 | Feedwater | - | 153 | - | - | - | - | - | 23 | 175 | - | - | 175 | - | - | - | - | - | - | 2,215 | - |
| 4a.1.5.14 | Feedwater - RCA | - | 195 | 7 | 24 | 537 | - | - | 133 | 895 | 895 | - | - | 3,208 | - | - | - | - | 130,294 | 2,651 | - |
| 4a.1.5.15 | Gland Seal | - | 34 | - | - | - | - | - | 5 | 39 | - | - | 39 | - | - | - | - | - | - | 505 | - |
| 4a.1.5.16 | Heater Drain | - | 400 | - | - | - | - | - | 60 | 460 | - | - | 460 | - | - | - | - | - | - | 5,881 | - |
| 4a.1.5.17 | Internal Circ Water & CDSR | - | 27 | - | - | - | - | - | 4 | 31 | - | - | 31 | - | - | - | - | - | - | 389 | - |
| 4a.1.5.18 | Main Gen/Exciter/Transformer | - | 0 | - | - | - | - | - | 0 | 0 | - | - | 0 | - | - | - | - | - | - | 5 | - |
| 4a.1.5.19 | Main Steam | - | 115 | - | - | - | - | - | 17 | 133 | - | - | 133 | - | - | - | - | - | - | 1,690 | - |
| 4a.1.5.20 | Main Steam - RCA | - | 366 | 10 | 37 | 844 | - | - | 225 | 1,482 | 1,482 | - | - | 5,044 | - | - | - | - | 204,825 | 4,956 | - |
| 4a.1.5.21 | Steam Generator Blowdown | - | 434 | 22 | 29 | 340 | 234 | - | 224 | 1,282 | 1,282 | - | - | 2,031 | 686 | - | - | - | 126,640 | 5,974 | - |
| 4a.1.5.22 | Steam Generators | - | 5 | - | - | - | - | - | 1 | 6 | - | - | 6 | - | - | - | - | - | - | 75 | - |
| 4a.1.5.23 | Turbine & Moisture Separators | - | 386 | - | - | - | - | - | 58 | 444 | - | - | 444 | - | - | - | - | - | - | 5,609 | - |
| 4a.1.5.24 | Turbine Oil Purification | - | 70 | - | - | - | - | - | 11 | 81 | - | - | 81 | - | - | - | - | - | - | 1,003 | - |
| 4a.1.5 | Totals | - | 3,401 | 44 | 108 | 2,144 | 234 | - | 1,037 | 6,967 | 4,510 | - | - | 2,458 | 12,815 | 686 | - | - | 564,572 | 48,101 | - |
| 4a.1.6 | Scaffolding in support of decommissioning | - | 909 | 3 | 1 | 26 | 4 | - | 233 | 1,176 | 1,176 | - | - | 138 | 12 | - | - | - | 6,985 | 6,020 | - |
| 4a.1 | Subtotal Period 4a Activity Costs | 146 | 22,144 | 17,570 | 3,426 | 6,311 | 17,850 | 556 | 23,666 | 91,669 | 89,211 | - | 2,458 | 40,406 | 29,203 | - | 742 | - | 3,889,412 | 163,954 | 5,187 |
| Period 4a Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 4a.2.1 | Retired RPV upper internals package | - | 128 | 166 | 58 | - | 1,583 | - | 944 | 2,879 | 2,879 | - | - | - | 572 | 125 | - | - | 49,800 | 1,667 | 67 |
| 4a.2 | Subtotal Period 4a Additional Costs | - | 128 | 166 | 58 | - | 1,583 | - | 944 | 2,879 | 2,879 | - | - | - | 572 | 125 | - | - | 49,800 | 1,667 | 67 |
| Period 4a Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 4a.3.1 | Process decommissioning water waste | 2 | - | 4 | 8 | - | 17 | - | 7 | 38 | 38 | - | - | - | 39 | - | - | - | 2,337 | 8 | - |
| 4a.3.2 | Process decommissioning chemical flush waste | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 4a.3.3 | Small tool allowance | - | 213 | - | - | - | - | - | 32 | 245 | 220 | - | 24 | - | - | - | - | - | - | - | - |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table I-1
Prairie Island SAFSTOR Unit 1
SAFSTOR Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| Period 4a Collateral Costs (continued) | | | | | | | | | | | | | | | | | | | | | |
| 4a.3.4 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 2,163 | 324 | 2,487 | - | 2,487 | - | - | - | - | - | - | - | - | - |
| 4a.3.5 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 1,660 | - | 1,660 | - | 1,660 | - | - | - | - | - | - | - | - | - |
| 4a.3 | Subtotal Period 4a Collateral Costs | 2 | 213 | 4 | 8 | - | 17 | 3,823 | 363 | 4,430 | 258 | 4,147 | 24 | - | 39 | - | - | - | - | 2,337 | 8 |
| Period 4a Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 4a.4.1 | Decon supplies | 100 | - | - | - | - | - | - | 25 | 125 | 125 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.2 | Insurance | - | - | - | - | - | - | 643 | 64 | 708 | 708 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.3 | Property taxes | - | - | - | - | - | - | 4,441 | 444 | 4,886 | 2,985 | 1,901 | - | - | - | - | - | - | - | - | - |
| 4a.4.4 | Health physics supplies | - | 1,744 | - | - | - | - | - | 436 | 2,181 | 2,181 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.5 | Heavy equipment rental | - | 3,325 | - | - | - | - | - | 499 | 3,824 | 3,824 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.6 | Disposal of DAW generated | - | - | 59 | 24 | - | 245 | - | 71 | 398 | 398 | - | - | - | 2,972 | - | - | - | - | 59,446 | 97 |
| 4a.4.7 | Plant energy budget | - | - | - | - | - | - | 2,047 | 307 | 2,354 | 2,354 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.8 | NRC ISFSI Fees | - | - | - | - | - | - | 159 | 16 | 175 | - | 175 | - | - | - | - | - | - | - | - | - |
| 4a.4.9 | NRC Fees | - | - | - | - | - | - | 643 | 64 | 707 | 707 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.10 | Emergency Planning Fees | - | - | - | - | - | - | 99 | 10 | 108 | - | 108 | - | - | - | - | - | - | - | - | - |
| 4a.4.11 | Fixed Overhead | - | - | - | - | - | - | 1,581 | 237 | 1,818 | 1,818 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.12 | Liquid Radwaste Processing Equipment/Services | - | - | - | - | - | - | 565 | 85 | 649 | 649 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.13 | ISFSI Operating Costs | - | - | - | - | - | - | 74 | 11 | 86 | - | 86 | - | - | - | - | - | - | - | - | - |
| 4a.4.14 | Railroad Track Maintenance | - | - | - | - | - | - | 83 | 12 | 96 | 96 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.15 | Remedial Actions Surveys | - | - | - | - | - | - | 1,489 | 223 | 1,712 | 1,712 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.16 | Security Staff Cost | - | - | - | - | - | - | 6,863 | 1,029 | 7,892 | 5,943 | 1,949 | - | - | - | - | - | - | - | - | 105,553 |
| 4a.4.17 | DOC Staff Cost | - | - | - | - | - | - | 17,190 | 2,579 | 19,769 | 19,769 | - | - | - | - | - | - | - | - | - | 189,964 |
| 4a.4.18 | Utility Staff Cost | - | - | - | - | - | - | 21,887 | 3,283 | 25,170 | 24,389 | 780 | - | - | - | - | - | - | - | - | 343,058 |
| 4a.4 | Subtotal Period 4a Period-Dependent Costs | 100 | 5,069 | 59 | 24 | - | 245 | 57,763 | 9,396 | 72,656 | 67,657 | 4,999 | - | - | 2,972 | - | - | - | - | 59,446 | 97 |
| 4a.0 | TOTAL PERIOD 4a COST | 248 | 27,554 | 17,799 | 3,516 | 6,311 | 19,695 | 62,142 | 34,369 | 171,634 | 160,006 | 9,146 | 2,482 | 40,406 | 32,786 | 125 | 742 | - | - | 4,000,995 | 165,725 |
| PERIOD 4b - Site Decontamination | | | | | | | | | | | | | | | | | | | | | |
| Period 4b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| 4b.1.1 | Remove spent fuel racks | 314 | 35 | 86 | 41 | - | 703 | - | 356 | 1,535 | 1,535 | - | - | - | 2,092 | - | - | - | - | 132,919 | 576 |
| Disposal of Plant Systems | | | | | | | | | | | | | | | | | | | | | |
| 4b.1.2.1 | Aux Bldg Normal Ventilation | - | 2 | 0 | 0 | 1 | - | - | 1 | 3 | 3 | - | - | 3 | - | - | - | - | - | 140 | 26 |
| 4b.1.2.3 | Buildings Maintenance | - | 5 | - | - | - | - | - | 1 | 5 | - | - | 5 | - | - | - | - | - | - | - | 65 |
| 4b.1.2.4 | Chemical & Volume Control | - | 1,263 | 89 | 90 | 753 | 973 | - | 694 | 3,861 | 3,861 | - | - | 4,498 | 2,846 | - | - | - | - | 366,565 | 17,235 |
| 4b.1.2.5 | Component Cooling - RCA | - | 858 | 25 | 91 | 2,079 | - | - | 543 | 3,597 | 3,597 | - | - | 12,427 | - | - | - | - | - | 504,675 | 11,242 |
| 4b.1.2.6 | Containment Cooling | - | 74 | - | - | - | - | - | 11 | 85 | - | - | 85 | - | - | - | - | - | - | - | 1,086 |
| 4b.1.2.7 | Containment Cooling - RCA | - | 304 | 7 | 25 | 569 | - | - | 166 | 1,070 | 1,070 | - | - | 3,400 | - | - | - | - | - | 138,090 | 3,971 |
| 4b.1.2.8 | Containment Hydrogen Control - RCA | - | 30 | 0 | 1 | 18 | - | - | 10 | 59 | 59 | - | - | 105 | - | - | - | - | - | 4,278 | 401 |
| 4b.1.2.9 | Containment Spray - RCA | - | 93 | 2 | 6 | 145 | - | - | 46 | 293 | 293 | - | - | 868 | - | - | - | - | - | 35,249 | 1,217 |
| 4b.1.2.10 | Containment Ventilation | - | 229 | 24 | 51 | 828 | 248 | - | 254 | 1,635 | 1,635 | - | - | 4,951 | 737 | - | - | - | - | 247,952 | 3,278 |
| 4b.1.2.11 | Cooling Water | - | 163 | - | - | - | - | - | 24 | 187 | - | - | 187 | - | - | - | - | - | - | - | 2,396 |
| 4b.1.2.12 | Cooling Water - RCA | - | 658 | 16 | 57 | 1,293 | - | - | 368 | 2,392 | 2,392 | - | - | 7,728 | - | - | - | - | - | 313,832 | 8,594 |
| 4b.1.2.13 | D1 Emergency Diesel | - | 50 | - | - | - | - | - | 8 | 58 | - | - | 58 | - | - | - | - | - | - | - | 730 |
| 4b.1.2.14 | D2 Emergency Diesel | - | 36 | - | - | - | - | - | 5 | 41 | - | - | 41 | - | - | - | - | - | - | - | 522 |
| 4b.1.2.15 | Diesel Rooms Ventilation | - | 9 | - | - | - | - | - | 1 | 11 | - | - | 11 | - | - | - | - | - | - | - | 135 |
| 4b.1.2.16 | Electrical - Clean | - | 1,905 | - | - | - | - | - | 286 | 2,191 | - | - | 2,191 | - | - | - | - | - | - | - | 26,981 |
| 4b.1.2.17 | Electrical - Contaminated | - | 553 | 7 | 20 | 423 | 32 | - | 213 | 1,248 | 1,248 | - | - | 2,527 | 95 | - | - | - | - | 108,690 | 7,488 |
| 4b.1.2.18 | Electrical - Contaminated - Fuel Pool | - | 137 | 2 | 5 | 103 | 8 | - | 53 | 307 | 307 | - | - | 615 | 23 | - | - | - | - | 26,449 | 1,857 |
| 4b.1.2.19 | Electrical - Decontaminated | - | 3,787 | 48 | 173 | 3,940 | - | - | 1,569 | 9,518 | 9,518 | - | - | 23,551 | - | - | - | - | - | 956,401 | 49,378 |
| 4b.1.2.20 | Electrical - Decontaminated - Fuel Pool | - | 947 | 12 | 43 | 986 | - | - | 392 | 2,380 | 2,380 | - | - | 5,893 | - | - | - | - | - | 239,327 | 12,340 |
| 4b.1.2.21 | Fuel Handling | - | 108 | 6 | 11 | 152 | 73 | - | 70 | 421 | 421 | - | - | 908 | 218 | - | - | - | - | 50,723 | 1,595 |
| 4b.1.2.22 | Fuel Oil | - | 121 | - | - | - | - | - | 18 | 140 | - | - | 140 | - | - | - | - | - | - | - | 1,697 |
| 4b.1.2.23 | HVAC - Clean | - | 120 | - | - | - | - | - | 18 | 138 | - | - | 138 | - | - | - | - | - | - | - | 1,891 |
| 4b.1.2.24 | HVAC - Contaminated | - | 337 | 9 | 26 | 546 | 41 | - | 181 | 1,141 | 1,141 | - | - | 3,261 | 123 | - | - | - | - | 140,257 | 4,335 |
| 4b.1.2.25 | HVAC - Contaminated - Fuel Pool | - | 145 | 4 | 11 | 234 | 18 | - | 78 | 489 | 489 | - | - | 1,398 | 53 | - | - | - | - | 60,110 | 1,858 |
| 4b.1.2.26 | Incore Instrumentation | - | 25 | 1 | 2 | 10 | 19 | - | 13 | 70 | 70 | - | - | 60 | 57 | - | - | - | - | 6,058 | 382 |
| 4b.1.2.27 | Misc Drains & Vents | - | 212 | 15 | 13 | 65 | 176 | - | 110 | 592 | 592 | - | - | 390 | 514 | - | - | - | - | 49,062 | 2,764 |
| 4b.1.2.28 | Reactor Coolant | - | 283 | 21 | 18 | 58 | 265 | - | 150 | 796 | 796 | - | - | 344 | 777 | - | - | - | - | 64,085 | 3,865 |
| 4b.1.2.29 | Reactor Hot Sampling | - | 125 | 12 | 7 | 11 | 118 | - | 65 | 339 | 339 | - | - | 66 | 342 | - | - | - | - | 25,063 | 1,611 |
| 4b.1.2.30 | Reactor Makeup | - | 73 | - | - | - | - | - | 11 | 84 | - | - | 84 | - | - | - | - | - | - | - | 1,042 |
| 4b.1.2.31 | Reactor Vessel | - | 19 | 1 | 0 | 4 | 5 | - | 7 | 36 | 36 | - | - | 26 | 14 | - | - | - | - | 2,000 | 260 |
| 4b.1.2.32 | Residual Heat Removal | - | 378 | 85 | 86 | 484 | 1,105 | - | 465 | 2,603 | 2,603 | - | - | 2,895 | 3,252 | - | - | - | - | 326,425 | 5,374 |
| 4b.1.2.33 | Safeguards Chilled Water | - | 18 | - | - | - | - | - | 3 | 20 | - | - | 20 | - | - | - | - | - | - | - | 259 |
| 4b.1.2.34 | Safeguards Chilled Water - RCA | - | 85 | 1 | 4 | 83 | - | - | 34 | 207 | 207 | - | - | 495 | - | - | - | - | - | 20,100 | 1,019 |
| 4b.1.2.35 | Safety Injection | - | 809 | 42 | 73 | 1,136 | 393 | - | 486 | 2,939 | 2,939 | - | - | 6,788 | 1,156 | - | - | - | - | 349,908 | 11,276 |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table I-1
Prairie Island SAFSTOR Unit 1
SAFSTOR Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|---------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| Disposal of Plant Systems (continued) | | | | | | | | | | | | | | | | | | | | | | |
| 4b.1.2.36 | Sampling | - | 54 | 4 | 3 | 10 | 37 | - | 25 | 133 | 133 | - | - | 59 | 107 | - | - | - | - | 9,420 | 731 | - |
| 4b.1.2.37 | Shield Bldg Ventilation | - | 125 | 14 | 26 | 360 | 165 | - | 132 | 821 | 821 | - | - | 2,152 | 491 | - | - | - | - | 118,583 | 1,811 | - |
| 4b.1.2.38 | Spent Fuel Pool Cooling | - | 324 | 34 | 32 | 135 | 450 | - | 222 | 1,198 | 1,198 | - | - | 806 | 1,325 | - | - | - | - | 117,816 | 4,400 | - |
| 4b.1.2.39 | Station & Instrument Air | - | 20 | - | - | - | - | - | 3 | 23 | - | - | 23 | - | - | - | - | - | - | - | 300 | - |
| 4b.1.2.40 | Station & Instrument Air - RCA | - | 81 | 1 | 2 | 56 | - | - | 29 | 169 | 169 | - | - | 332 | - | - | - | - | - | 13,496 | 1,053 | - |
| 4b.1.2.41 | Station & Instrument Air - RCA Fuel Pool | - | 20 | 0 | 1 | 14 | - | - | 7 | 42 | 42 | - | - | 83 | - | - | - | - | - | 3,374 | 263 | - |
| 4b.1.2.42 | Turbine Bldg Traps & Drains | - | 50 | - | - | - | - | - | 8 | 58 | - | - | 58 | - | - | - | - | - | - | - | 767 | - |
| 4b.1.2.43 | Unit Coolers | - | 42 | - | - | - | - | - | 6 | 49 | - | - | 49 | - | - | - | - | - | - | - | 611 | - |
| 4b.1.2.44 | Unit Coolers - RCA | - | 55 | 0 | 2 | 39 | - | - | 20 | 115 | 115 | - | - | 230 | - | - | - | - | - | 9,348 | 683 | - |
| 4b.1.2 | Totals | - | 14,735 | 481 | 883 | 14,533 | 4,126 | - | 6,807 | 41,565 | 38,474 | - | 3,091 | 86,861 | 12,129 | - | - | - | - | 4,307,475 | 198,796 | - |
| 4b.1.3 | Scaffolding in support of decommissioning | - | 1,363 | 4 | 2 | 38 | 6 | - | 349 | 1,763 | 1,763 | - | - | 207 | 18 | - | - | - | - | 10,477 | 9,030 | - |
| Decontamination of Site Buildings | | | | | | | | | | | | | | | | | | | | | | |
| 4b.1.4.1 | Reactor | 1,096 | 2,527 | 240 | 1,236 | 373 | 7,080 | - | 3,215 | 15,766 | 15,766 | - | - | 2,230 | 67,325 | - | - | - | - | 3,286,372 | 45,729 | - |
| 4b.1.4.2 | Backwash Waste Receiving Tank | - | 25 | 3 | 17 | - | 97 | - | 33 | 175 | 175 | - | - | - | 929 | - | - | - | - | 43,896 | 266 | - |
| 4b.1.4 | Totals | 1,096 | 2,552 | 243 | 1,253 | 373 | 7,177 | - | 3,248 | 15,941 | 15,941 | - | - | 2,230 | 68,254 | - | - | - | - | 3,330,268 | 45,995 | - |
| 4b.1.5 | Prepare/submit License Termination Plan | - | - | - | - | - | - | 526 | 79 | 605 | 605 | - | - | - | - | - | - | - | - | - | - | 4,096 |
| 4b.1.6 | Receive NRC approval of termination plan | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - | - |
| 4b.1 | Subtotal Period 4b Activity Costs | 1,410 | 18,685 | 814 | 2,179 | 14,945 | 12,012 | 526 | 10,839 | 61,410 | 58,319 | - | 3,091 | 89,298 | 82,494 | - | - | - | - | 7,781,139 | 254,398 | 4,096 |
| Period 4b Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 4b.2.1 | License Termination Survey Planning | - | - | - | - | - | - | 1,037 | 311 | 1,348 | 1,348 | - | - | - | - | - | - | - | - | - | - | 6,240 |
| 4b.2.2 | Excavation of Underground Services | - | 1,175 | - | - | - | - | 225 | 328 | 1,728 | 1,728 | - | - | - | - | - | - | - | - | - | 7,411 | - |
| 4b.2.3 | Operational Equipment | - | - | 11 | 36 | 606 | - | - | 97 | 751 | 751 | - | - | 5,880 | - | - | - | - | - | 147,000 | 16 | - |
| 4b.2 | Subtotal Period 4b Additional Costs | - | 1,175 | 11 | 36 | 606 | - | 1,262 | 736 | 3,827 | 3,827 | - | - | 5,880 | - | - | - | - | - | 147,000 | 7,427 | 6,240 |
| Period 4b Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 4b.3.1 | Process decommissioning water waste | 5 | - | 9 | 16 | - | 37 | - | 15 | 83 | 83 | - | - | - | 85 | - | - | - | - | 5,092 | 17 | - |
| 4b.3.3 | Small tool allowance | - | 307 | - | - | - | - | - | 46 | 353 | 353 | - | - | - | - | - | - | - | - | - | - | - |
| 4b.3.4 | Decommissioning Equipment Disposition | - | - | 130 | 67 | 1,112 | 178 | - | 234 | 1,722 | 1,722 | - | - | 6,000 | 529 | - | - | - | - | 303,608 | 147 | - |
| 4b.3.5 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 2,225 | - | 2,225 | - | 2,225 | - | - | - | - | - | - | - | - | - | - |
| 4b.3 | Subtotal Period 4b Collateral Costs | 5 | 307 | 139 | 84 | 1,112 | 215 | 2,225 | 296 | 4,382 | 2,158 | 2,225 | - | 6,000 | 614 | - | - | - | - | 308,700 | 163 | - |
| Period 4b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 4b.4.1 | Decon supplies | 564 | - | - | - | - | - | - | 141 | 705 | 705 | - | - | - | - | - | - | - | - | - | - | - |
| 4b.4.2 | Insurance | - | - | - | - | - | - | 862 | 86 | 949 | 949 | - | - | - | - | - | - | - | - | - | - | - |
| 4b.4.3 | Property taxes | - | - | - | - | - | - | 5,819 | 582 | 6,401 | 3,853 | 2,548 | - | - | - | - | - | - | - | - | - | - |
| 4b.4.4 | Health physics supplies | - | 2,435 | - | - | - | - | - | 609 | 3,043 | 3,043 | - | - | - | - | - | - | - | - | - | - | - |
| 4b.4.5 | Heavy equipment rental | - | 4,577 | - | - | - | - | - | 687 | 5,263 | 5,263 | - | - | - | - | - | - | - | - | - | - | - |
| 4b.4.6 | Disposal of DAW generated | - | - | 77 | 31 | - | 322 | - | 93 | 523 | 523 | - | - | - | 3,905 | - | - | - | - | 78,097 | 127 | - |
| 4b.4.7 | Plant energy budget | - | - | - | - | - | - | 2,165 | 325 | 2,490 | 2,490 | - | - | - | - | - | - | - | - | - | - | - |
| 4b.4.8 | NRC ISFSI Fees | - | - | - | - | - | - | 213 | 21 | 234 | - | 234 | - | - | - | - | - | - | - | - | - | - |
| 4b.4.9 | NRC Fees | - | - | - | - | - | - | 862 | 86 | 948 | 948 | - | - | - | - | - | - | - | - | - | - | - |
| 4b.4.10 | Emergency Planning Fees | - | - | - | - | - | - | 132 | 13 | 145 | - | 145 | - | - | - | - | - | - | - | - | - | - |
| 4b.4.11 | Fixed Overhead | - | - | - | - | - | - | 2,118 | 318 | 2,436 | 2,436 | - | - | - | - | - | - | - | - | - | - | - |
| 4b.4.12 | Liquid Radwaste Processing Equipment/Services | - | - | - | - | - | - | 757 | 113 | 870 | 870 | - | - | - | - | - | - | - | - | - | - | - |
| 4b.4.13 | ISFSI Operating Costs | - | - | - | - | - | - | 100 | 15 | 115 | - | 115 | - | - | - | - | - | - | - | - | - | - |
| 4b.4.14 | Railroad Track Maintenance | - | - | - | - | - | - | 111 | 17 | 128 | 128 | - | - | - | - | - | - | - | - | - | - | - |
| 4b.4.15 | Remedial Actions Surveys | - | - | - | - | - | - | 1,995 | 299 | 2,294 | 2,294 | - | - | - | - | - | - | - | - | - | - | - |
| 4b.4.16 | Security Staff Cost | - | - | - | - | - | - | 1,202 | 180 | 1,383 | 462 | 921 | - | - | - | - | - | - | - | - | - | 20,373 |
| 4b.4.17 | DOC Staff Cost | - | - | - | - | - | - | 15,039 | 2,256 | 17,294 | 17,294 | - | - | - | - | - | - | - | - | - | - | 174,093 |
| 4b.4.18 | Utility Staff Cost | - | - | - | - | - | - | 18,793 | 2,819 | 21,612 | 20,790 | 821 | - | - | - | - | - | - | - | - | - | 311,145 |
| 4b.4 | Subtotal Period 4b Period-Dependent Costs | 564 | 7,011 | 77 | 31 | - | 322 | 50,169 | 8,660 | 66,835 | 62,051 | 4,784 | - | - | 3,905 | - | - | - | - | 78,097 | 127 | 505,611 |
| 4b.0 | TOTAL PERIOD 4b COST | 1,979 | 27,178 | 1,042 | 2,330 | 16,663 | 12,549 | 54,182 | 20,531 | 136,453 | 126,354 | 7,009 | 3,091 | 101,178 | 87,013 | - | - | - | - | 8,314,936 | 262,116 | 515,947 |
| PERIOD 4e - Delay before License Termination | | | | | | | | | | | | | | | | | | | | | | |
| Period 4e Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Period 4e Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 4e.3.1 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 986 | - | 986 | - | 986 | - | - | - | - | - | - | - | - | - | - |
| 4e.3 | Subtotal Period 4e Collateral Costs | - | - | - | - | - | - | 986 | - | 986 | - | 986 | - | - | - | - | - | - | - | - | - | - |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table I-1
Prairie Island SAFSTOR Unit 1
SAFSTOR Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|---|---|--------------|---------------|-----------------|-----------------|---------------------------|---------------------|----------------|-------------------|----------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|---------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| Period 4e Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 4e.4.1 | Insurance | - | - | - | - | - | - | 382 | 38 | 420 | - | 420 | - | - | - | - | - | - | - | - | - | - |
| 4e.4.2 | Property taxes | - | - | - | - | - | - | 2,498 | 250 | 2,748 | 1,624 | 1,124 | - | - | - | - | - | - | - | - | - | - |
| 4e.4.3 | Health physics supplies | - | 87 | - | - | - | - | - | 22 | 109 | 109 | - | - | - | - | - | - | - | - | - | - | - |
| 4e.4.4 | Disposal of DAW generated | - | - | 2 | 1 | - | 6 | - | 2 | 11 | 11 | - | - | - | 79 | - | - | - | - | 1,573 | 3 | - |
| 4e.4.6 | NRC ISFSI Fees | - | - | - | - | - | - | 94 | 9 | 104 | - | 104 | - | - | - | - | - | - | - | - | - | - |
| 4e.4.7 | NRC Fees | - | - | - | - | - | - | 162 | 16 | 178 | 178 | - | - | - | - | - | - | - | - | - | - | - |
| 4e.4.8 | Emergency Planning Fees | - | - | - | - | - | - | 58 | 6 | 64 | - | 64 | - | - | - | - | - | - | - | - | - | - |
| 4e.4.9 | Fixed Overhead | - | - | - | - | - | - | 939 | 141 | 1,079 | 1,079 | - | - | - | - | - | - | - | - | - | - | - |
| 4e.4.10 | ISFSI Operating Costs | - | - | - | - | - | - | 44 | 7 | 51 | - | 51 | - | - | - | - | - | - | - | - | - | - |
| 4e.4.11 | Railroad Track Maintenance | - | - | - | - | - | - | 49 | 7 | 57 | 57 | - | - | - | - | - | - | - | - | - | - | - |
| 4e.4.12 | Utility Staff Cost | - | - | - | - | - | - | 696 | 104 | 801 | 742 | 58 | - | - | - | - | - | - | - | - | - | 11,488 |
| 4e.4 | Subtotal Period 4e Period-Dependent Costs | - | 87 | 2 | 1 | - | 6 | 4,923 | 602 | 5,622 | 3,800 | 1,822 | - | - | 79 | - | - | - | - | 1,573 | 3 | 11,488 |
| 4e.0 | TOTAL PERIOD 4e COST | - | 87 | 2 | 1 | - | 6 | 5,909 | 602 | 6,607 | 3,800 | 2,807 | - | - | 79 | - | - | - | - | 1,573 | 3 | 11,488 |
| PERIOD 4f - License Termination | | | | | | | | | | | | | | | | | | | | | | |
| Period 4f Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| 4f.1.1 | ORISE confirmatory survey | - | - | - | - | - | - | 166 | 50 | 216 | 216 | - | - | - | - | - | - | - | - | - | - | - |
| 4f.1.2 | Terminate license | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 4f.1 | Subtotal Period 4f Activity Costs | - | - | - | - | - | - | 166 | 50 | 216 | 216 | - | - | - | - | - | - | - | - | - | - | - |
| Period 4f Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 4f.2.1 | License Termination Survey | - | - | - | - | - | - | 3,199 | 960 | 4,159 | 4,159 | - | - | - | - | - | - | - | - | - | 40,531 | 3,120 |
| 4f.2 | Subtotal Period 4f Additional Costs | - | - | - | - | - | - | 3,199 | 960 | 4,159 | 4,159 | - | - | - | - | - | - | - | - | - | 40,531 | 3,120 |
| Period 4f Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 4f.3.1 | DOC staff relocation expenses | - | - | - | - | - | - | 1,264 | 190 | 1,454 | 1,454 | - | - | - | - | - | - | - | - | - | - | - |
| 4f.3.2 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 218 | 33 | 250 | - | 250 | - | - | - | - | - | - | - | - | - | - |
| 4f.3.3 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 934 | - | 934 | - | 934 | - | - | - | - | - | - | - | - | - | - |
| 4f.3 | Subtotal Period 4f Collateral Costs | - | - | - | - | - | - | 2,416 | 222 | 2,638 | 1,454 | 1,185 | - | - | - | - | - | - | - | - | - | - |
| Period 4f Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 4f.4.1 | Insurance | - | - | - | - | - | - | 362 | 36 | 398 | - | 398 | - | - | - | - | - | - | - | - | - | - |
| 4f.4.2 | Property taxes | - | - | - | - | - | - | 2,306 | 231 | 2,537 | 1,469 | 1,068 | - | - | - | - | - | - | - | - | - | - |
| 4f.4.3 | Health physics supplies | - | 501 | - | - | - | - | - | 125 | 626 | 626 | - | - | - | - | - | - | - | - | - | - | - |
| 4f.4.4 | Disposal of DAW generated | - | - | 7 | 3 | - | 28 | - | 8 | 45 | 45 | - | - | - | 334 | - | - | - | - | 6,685 | 11 | - |
| 4f.4.5 | Plant energy budget | - | - | - | - | - | - | 243 | 36 | 279 | 279 | - | - | - | - | - | - | - | - | - | - | - |
| 4f.4.6 | NRC ISFSI Fees | - | - | - | - | - | - | 90 | 9 | 98 | - | 98 | - | - | - | - | - | - | - | - | - | - |
| 4f.4.7 | NRC Fees | - | - | - | - | - | - | 422 | 42 | 465 | 465 | - | - | - | - | - | - | - | - | - | - | - |
| 4f.4.8 | Emergency Planning Fees | - | - | - | - | - | - | 55 | 6 | 61 | - | 61 | - | - | - | - | - | - | - | - | - | - |
| 4f.4.9 | Fixed Overhead | - | - | - | - | - | - | 890 | 133 | 1,023 | 1,023 | - | - | - | - | - | - | - | - | - | - | - |
| 4f.4.10 | ISFSI Operating Costs | - | - | - | - | - | - | 42 | 6 | 48 | - | 48 | - | - | - | - | - | - | - | - | - | - |
| 4f.4.11 | Railroad Track Maintenance | - | - | - | - | - | - | 47 | 7 | 54 | 54 | - | - | - | - | - | - | - | - | - | - | - |
| 4f.4.12 | Security Staff Cost | - | - | - | - | - | - | 1,835 | 275 | 2,111 | 927 | 1,184 | - | - | - | - | - | - | - | - | - | 27,614 |
| 4f.4.13 | DOC Staff Cost | - | - | - | - | - | - | 4,238 | 636 | 4,874 | 4,874 | - | - | - | - | - | - | - | - | - | - | 46,283 |
| 4f.4.14 | Utility Staff Cost | - | - | - | - | - | - | 4,011 | 602 | 4,613 | 4,175 | 438 | - | - | - | - | - | - | - | - | - | 59,507 |
| 4f.4 | Subtotal Period 4f Period-Dependent Costs | - | 501 | 7 | 3 | - | 28 | 14,541 | 2,153 | 17,232 | 13,936 | 3,296 | - | - | 334 | - | - | - | - | 6,685 | 11 | 133,404 |
| 4f.0 | TOTAL PERIOD 4f COST | - | 501 | 7 | 3 | - | 28 | 20,322 | 3,384 | 24,245 | 19,764 | 4,481 | - | - | 334 | - | - | - | - | 6,685 | 40,542 | 136,524 |
| PERIOD 4 TOTALS | | 2,227 | 55,320 | 18,849 | 5,850 | 22,974 | 32,278 | 142,555 | 58,887 | 338,939 | 309,924 | 23,443 | 5,573 | 141,584 | 120,212 | 125 | 742 | - | 12,324,190 | 468,386 | 1,307,787 | |
| PERIOD 5b - Site Restoration | | | | | | | | | | | | | | | | | | | | | | |
| Period 5b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Demolition of Remaining Site Buildings | | | | | | | | | | | | | | | | | | | | | | |
| 5b.1.1.1 | Reactor | - | 4,644 | - | - | - | - | - | 697 | 5,341 | - | - | 5,341 | - | - | - | - | - | - | - | 44,669 | - |
| 5b.1.1.2 | Condensate Storage Tank Foundation | - | 3 | - | - | - | - | - | 0 | 4 | - | - | 4 | - | - | - | - | - | - | - | 16 | - |
| 5b.1.1.3 | Structures below 3' below grade | - | 1,785 | - | - | - | - | - | 268 | 2,052 | - | - | 2,052 | - | - | - | - | - | - | - | 9,238 | - |
| 5b.1.1.4 | Turbine | - | 2,139 | - | - | - | - | - | 321 | 2,460 | - | - | 2,460 | - | - | - | - | - | - | - | 21,985 | - |
| 5b.1.1.5 | Turbine Pedestal | - | 365 | - | - | - | - | - | 55 | 420 | - | - | 420 | - | - | - | - | - | - | - | 1,857 | - |
| 5b.1.1 | Totals | - | 8,936 | - | - | - | - | - | 1,340 | 10,276 | - | - | 10,276 | - | - | - | - | - | - | - | 77,765 | - |

**Prairie Island Nuclear Generating Plant
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**Table I-1
Prairie Island SAFSTOR Unit 1
SAFSTOR Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|---------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| Site Closeout Activities | | | | | | | | | | | | | | | | | | | | | | |
| 5b.1.2 | Grade & landscape site | - | 448 | - | - | - | - | - | 67 | 515 | - | - | 515 | - | - | - | - | - | - | - | 921 | - |
| 5b.1.3 | Final report to NRC | - | - | - | - | - | - | 200 | 30 | 231 | 231 | - | - | - | - | - | - | - | - | - | - | 1,560 |
| 5b.1 | Subtotal Period 5b Activity Costs | - | 9,384 | - | - | - | - | 200 | 1,438 | 11,022 | 231 | - | 10,792 | - | - | - | - | - | - | - | 78,686 | 1,560 |
| Period 5b Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 5b.2.1 | Clean Concrete Disposal | - | 2,242 | - | - | - | - | 5 | 337 | 2,583 | - | - | 2,583 | - | - | - | - | - | - | - | 8,386 | - |
| 5b.2.2 | Intake Structure Cofferdam | - | 623 | - | - | - | - | - | 93 | 716 | - | - | 716 | - | - | - | - | - | - | - | 5,168 | - |
| 5b.2.3 | Construction Debris | - | - | - | - | - | - | 10 | 2 | 12 | - | - | 12 | - | - | - | - | - | - | - | - | - |
| 5b.2.4 | Backfill | - | 3,011 | - | - | - | - | - | 452 | 3,462 | - | - | 3,462 | - | - | - | - | - | - | - | 2,904 | - |
| 5b.2.5 | Disposition of Original Casks | - | 24 | 80 | 418 | - | 2,390 | - | 728 | 3,640 | 3,640 | - | - | - | 8,929 | - | - | - | - | 1,059,612 | 146 | - |
| 5b.2 | Subtotal Period 5b Additional Costs | - | 5,899 | 80 | 418 | - | 2,390 | 15 | 1,611 | 10,413 | 3,640 | - | 6,773 | - | 8,929 | - | - | - | - | 1,059,612 | 16,604 | - |
| Period 5b Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 5b.3.1 | Small tool allowance | - | 122 | - | - | - | - | - | 18 | 140 | - | - | 140 | - | - | - | - | - | - | - | - | - |
| 5b.3.2 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 5,519 | 828 | 6,347 | - | 6,347 | - | - | - | - | - | - | - | - | - | - |
| 5b.3.3 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 2,649 | - | 2,649 | - | 2,649 | - | - | - | - | - | - | - | - | - | - |
| 5b.3 | Subtotal Period 5b Collateral Costs | - | 122 | - | - | - | - | 8,168 | 846 | 9,136 | - | 8,996 | 140 | - | - | - | - | - | - | - | - | - |
| Period 5b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 5b.4.1 | Insurance | - | - | - | - | - | - | 513 | 51 | 565 | - | 565 | - | - | - | - | - | - | - | - | - | - |
| 5b.4.2 | Property taxes | - | - | - | - | - | - | 5,904 | 590 | 6,494 | - | 2,663 | 3,831 | - | - | - | - | - | - | - | - | - |
| 5b.4.3 | Heavy equipment rental | - | 7,144 | - | - | - | - | - | 1,072 | 8,215 | - | - | 8,215 | - | - | - | - | - | - | - | - | - |
| 5b.4.4 | Plant energy budget | - | - | - | - | - | - | 344 | 52 | 395 | - | 395 | - | - | - | - | - | - | - | - | - | - |
| 5b.4.5 | NRC ISFSI Fees | - | - | - | - | - | - | 326 | 33 | 359 | - | 359 | - | - | - | - | - | - | - | - | - | - |
| 5b.4.6 | Emergency Planning Fees | - | - | - | - | - | - | 157 | 16 | 173 | - | 173 | - | - | - | - | - | - | - | - | - | - |
| 5b.4.7 | Fixed Overhead | - | - | - | - | - | - | 1,024 | 154 | 1,178 | - | 781 | 397 | - | - | - | - | - | - | - | - | - |
| 5b.4.8 | ISFSI Operating Costs | - | - | - | - | - | - | 119 | 18 | 136 | - | 136 | - | - | - | - | - | - | - | - | - | - |
| 5b.4.9 | Railroad Track Maintenance | - | - | - | - | - | - | 133 | 20 | 152 | (0) | 97 | 56 | - | - | - | - | - | - | - | - | - |
| 5b.4.10 | Security Staff Cost | - | - | - | - | - | - | 4,976 | 746 | 5,722 | 0 | 5,310 | 412 | - | - | - | - | - | - | - | - | 74,431 |
| 5b.4.11 | DOC Staff Cost | - | - | - | - | - | - | 10,921 | 1,638 | 12,559 | - | - | 12,559 | - | - | - | - | - | - | - | - | 116,885 |
| 5b.4.12 | Utility Staff Cost | - | - | - | - | - | - | 5,170 | 776 | 5,946 | - | 1,278 | 4,668 | - | - | - | - | - | - | - | - | 76,637 |
| 5b.4 | Subtotal Period 5b Period-Dependent Costs | - | 7,144 | - | - | - | - | 29,587 | 5,165 | 41,895 | 0 | 11,757 | 30,139 | - | - | - | - | - | - | - | - | 267,952 |
| 5b.0 | TOTAL PERIOD 5b COST | - | 22,548 | 80 | 418 | - | 2,390 | 37,970 | 9,060 | 72,467 | 3,871 | 20,753 | 47,843 | - | 8,929 | - | - | - | - | 1,059,612 | 95,290 | 269,512 |
| PERIOD 5c - Fuel Storage Operations/Shipping | | | | | | | | | | | | | | | | | | | | | | |
| Period 5c Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Period 5c Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 5c.3.1 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 89,253 | 13,388 | 102,641 | - | 102,641 | - | - | - | - | - | - | - | - | - | - |
| 5c.3.2 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 27,796 | - | 27,796 | - | 27,796 | - | - | - | - | - | - | - | - | - | - |
| 5c.3 | Subtotal Period 5c Collateral Costs | - | - | - | - | - | - | 117,049 | 13,388 | 130,437 | - | 130,437 | - | - | - | - | - | - | - | - | - | - |
| Period 5c Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 5c.4.1 | Insurance | - | - | - | - | - | - | 5,388 | 539 | 5,927 | - | 5,927 | - | - | - | - | - | - | - | - | - | - |
| 5c.4.2 | Property taxes | - | - | - | - | - | - | 31,074 | 3,107 | 34,181 | - | 34,181 | - | - | - | - | - | - | - | - | - | - |
| 5c.4.3 | Plant energy budget | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 5c.4.4 | NRC ISFSI Fees | - | - | - | - | - | - | 3,422 | 342 | 3,764 | - | 3,764 | - | - | - | - | - | - | - | - | - | - |
| 5c.4.5 | Emergency Planning Fees | - | - | - | - | - | - | 1,650 | 165 | 1,815 | - | 1,815 | - | - | - | - | - | - | - | - | - | - |
| 5c.4.6 | Fixed Overhead | - | - | - | - | - | - | 3,626 | 544 | 4,170 | - | 4,170 | - | - | - | - | - | - | - | - | - | - |
| 5c.4.7 | ISFSI Operating Costs | - | - | - | - | - | - | 1,245 | 187 | 1,432 | - | 1,432 | - | - | - | - | - | - | - | - | - | - |
| 5c.4.8 | Railroad Track Maintenance | - | - | - | - | - | - | 1,391 | 209 | 1,600 | - | 1,600 | - | - | - | - | - | - | - | - | - | - |
| 5c.4.9 | Security Staff Cost | - | - | - | - | - | - | 42,996 | 6,449 | 49,446 | - | 49,446 | - | - | - | - | - | - | - | - | - | 624,838 |
| 5c.4.10 | DOC Staff Cost | - | - | - | - | - | - | 3,411 | 512 | 3,922 | - | 3,922 | - | - | - | - | - | - | - | - | - | 23,142 |
| 5c.4.11 | Utility Staff Cost | - | - | - | - | - | - | 21,001 | 3,150 | 24,151 | - | 24,151 | - | - | - | - | - | - | - | - | - | 306,633 |
| 5c.4 | Subtotal Period 5c Period-Dependent Costs | - | - | - | - | - | - | 115,204 | 15,204 | 130,408 | - | 130,408 | - | - | - | - | - | - | - | - | - | 954,613 |
| 5c.0 | TOTAL PERIOD 5c COST | - | - | - | - | - | - | 232,252 | 28,592 | 260,844 | - | 260,844 | - | - | - | - | - | - | - | - | - | 954,613 |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table I-1
Prairie Island SAFSTOR Unit 1
SAFSTOR Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|-------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| PERIOD 5d - GTCC shipping | | | | | | | | | | | | | | | | | | | | | | |
| Period 5d Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Nuclear Steam Supply System Removal | | | | | | | | | | | | | | | | | | | | | | |
| 5d.1.1.1 | Vessel & Internals GTCC Disposal | - | - | 1,444 | - | - | 8,680 | - | 1,663 | 11,787 | 11,787 | - | - | - | - | - | - | - | 1,773 | 344,823 | - | - |
| 5d.1.1 | Totals | - | - | 1,444 | - | - | 8,680 | - | 1,663 | 11,787 | 11,787 | - | - | - | - | - | - | - | 1,773 | 344,823 | - | - |
| 5d.1 | Subtotal Period 5d Activity Costs | - | - | 1,444 | - | - | 8,680 | - | 1,663 | 11,787 | 11,787 | - | - | - | - | - | - | - | 1,773 | 344,823 | - | - |
| Period 5d Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 5d.3.1 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 28 | 4 | 32 | - | 32 | - | - | - | - | - | - | - | - | - | - |
| 5d.3.2 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 48 | - | 48 | - | 48 | - | - | - | - | - | - | - | - | - | - |
| 5d.3 | Subtotal Period 5d Collateral Costs | - | - | - | - | - | - | 76 | 4 | 80 | - | 80 | - | - | - | - | - | - | - | - | - | - |
| Period 5d Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 5d.4.1 | Insurance | - | - | - | - | - | - | 9 | 1 | 10 | 10 | - | - | - | - | - | - | - | - | - | - | - |
| 5d.4.2 | Property taxes | - | - | - | - | - | - | 53 | 5 | 58 | 58 | - | - | - | - | - | - | - | - | - | - | - |
| 5d.4.4 | NRC ISFSI Fees | - | - | - | - | - | - | 4 | 0 | 4 | - | 4 | - | - | - | - | - | - | - | - | - | - |
| 5d.4.5 | Emergency Planning Fees | - | - | - | - | - | - | 3 | 0 | 3 | - | 3 | - | - | - | - | - | - | - | - | - | - |
| 5d.4.6 | Fixed Overhead | - | - | - | - | - | - | 6 | 1 | 7 | 7 | - | - | - | - | - | - | - | - | - | - | - |
| 5d.4.7 | Railroad Track Maintenance | - | - | - | - | - | - | 2 | 0 | 3 | 3 | - | - | - | - | - | - | - | - | - | - | - |
| 5d.4.8 | Security Staff Cost | - | - | - | - | - | - | 74 | 11 | 85 | 85 | - | - | - | - | - | - | - | - | - | - | 1,077 |
| 5d.4.9 | Utility Staff Cost | - | - | - | - | - | - | 19 | 3 | 22 | 22 | - | - | - | - | - | - | - | - | - | - | 269 |
| 5d.4 | Subtotal Period 5d Period-Dependent Costs | - | - | - | - | - | - | 171 | 22 | 194 | 186 | 7 | - | - | - | - | - | - | - | - | - | 1,346 |
| 5d.0 | TOTAL PERIOD 5d COST | - | - | 1,444 | - | - | 8,680 | 247 | 1,689 | 12,060 | 11,973 | 87 | - | - | - | - | - | - | 1,773 | 344,823 | - | 1,346 |
| PERIOD 5e - ISFSI Decontamination | | | | | | | | | | | | | | | | | | | | | | |
| Period 5e Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Period 5e Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 5e.2.1 | License Termination ISFSI | - | 0 | 2 | 17 | - | 142 | 1,197 | 339 | 1,696 | 1,696 | - | - | - | 424 | - | - | - | - | 65,754 | 5,882 | 1,161 |
| 5e.2 | Subtotal Period 5e Additional Costs | - | 0 | 2 | 17 | - | 142 | 1,197 | 339 | 1,696 | 1,696 | - | - | - | 424 | - | - | - | - | 65,754 | 5,882 | 1,161 |
| Period 5e Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 5e.4.1 | Insurance | - | - | - | - | - | - | 93 | 23 | 116 | 116 | - | - | - | - | - | - | - | - | - | - | - |
| 5e.4.2 | Property taxes | - | - | - | - | - | - | 56 | 14 | 69 | 69 | - | - | - | - | - | - | - | - | - | - | - |
| 5e.4.3 | Plant energy budget | - | - | - | - | - | - | 11 | 3 | 13 | 13 | - | - | - | - | - | - | - | - | - | - | - |
| 5e.4.4 | Fixed Overhead | - | - | - | - | - | - | 54 | 14 | 68 | 68 | - | - | - | - | - | - | - | - | - | - | - |
| 5e.4.5 | Railroad Track Maintenance | - | - | - | - | - | - | 21 | 5 | 26 | 26 | - | - | - | - | - | - | - | - | - | - | - |
| 5e.4.6 | Security Staff Cost | - | - | - | - | - | - | 174 | 43 | 217 | 217 | - | - | - | - | - | - | - | - | - | - | 2,500 |
| 5e.4.7 | Utility Staff Cost | - | - | - | - | - | - | 129 | 32 | 161 | 161 | - | - | - | - | - | - | - | - | - | - | 1,896 |
| 5e.4 | Subtotal Period 5e Period-Dependent Costs | - | - | - | - | - | - | 536 | 134 | 670 | 670 | - | - | - | - | - | - | - | - | - | - | 4,396 |
| 5e.0 | TOTAL PERIOD 5e COST | - | 0 | 2 | 17 | - | 142 | 1,733 | 473 | 2,367 | 2,367 | - | - | - | 424 | - | - | - | - | 65,754 | 5,882 | 5,556 |
| PERIOD 5f - ISFSI Site Restoration | | | | | | | | | | | | | | | | | | | | | | |
| Period 5f Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Period 5f Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 5f.2.1 | Demolition and Site Restoration of ISFSI | - | 1,121 | - | - | - | - | 161 | 192 | 1,474 | - | - | 1,474 | - | - | - | - | - | - | - | 4,846 | 80 |
| 5f.2 | Subtotal Period 5f Additional Costs | - | 1,121 | - | - | - | - | 161 | 192 | 1,474 | - | - | 1,474 | - | - | - | - | - | - | - | 4,846 | 80 |
| Period 5f Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 5f.3.1 | Small tool allowance | - | 7 | - | - | - | - | - | 1 | 8 | - | - | 8 | - | - | - | - | - | - | - | - | - |
| 5f.3 | Subtotal Period 5f Collateral Costs | - | 7 | - | - | - | - | - | 1 | 8 | - | - | 8 | - | - | - | - | - | - | - | - | - |

**Prairie Island Nuclear Generating Plant
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**Table I-1
Prairie Island SAFSTOR Unit 1
SAFSTOR Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|----------------------------------|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|-------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| Period 5f Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 5f.4.2 | Property taxes | - | - | - | - | - | - | 28 | 3 | 31 | - | - | 31 | - | - | - | - | - | - | - | - | - |
| 5f.4.3 | Heavy equipment rental | - | 59 | - | - | - | - | - | 9 | 68 | - | - | 68 | - | - | - | - | - | - | - | - | - |
| 5f.4.4 | Plant energy budget | - | - | - | - | - | - | 6 | 1 | 6 | - | - | 6 | - | - | - | - | - | - | - | - | - |
| 5f.4.5 | Fixed Overhead | - | - | - | - | - | - | 28 | 4 | 32 | - | - | 32 | - | - | - | - | - | - | - | - | - |
| 5f.4.6 | Railroad Track Maintenance | - | - | - | - | - | - | 11 | 2 | 12 | - | - | 12 | - | - | - | - | - | - | - | - | - |
| 5f.4.7 | Security Staff Cost | - | - | - | - | - | - | 89 | 13 | 102 | - | - | 102 | - | - | - | - | - | - | - | - | 1,281 |
| 5f.4.8 | Utility Staff Cost | - | - | - | - | - | - | 55 | 8 | 63 | - | - | 63 | - | - | - | - | - | - | - | - | 795 |
| 5f.4 | Subtotal Period 5f Period-Dependent Costs | - | 59 | - | - | - | - | 216 | 40 | 315 | - | - | 315 | - | - | - | - | - | - | - | - | 2,076 |
| 5f.0 | TOTAL PERIOD 5f COST | - | 1,187 | - | - | - | - | 377 | 233 | 1,798 | - | - | 1,798 | - | - | - | - | - | - | - | 4,846 | 2,156 |
| PERIOD 5 TOTALS | | - | 23,736 | 1,525 | 435 | - | 11,212 | 272,580 | 40,048 | 349,536 | 18,210 | 281,684 | 49,641 | - | 9,353 | - | - | 1,773 | 1,470,189 | 106,017 | 1,233,184 | |
| TOTAL COST TO DECOMMISSION | | 6,192 | 94,084 | 20,994 | 6,793 | 23,152 | 45,944 | 1,425,301 | 233,914 | 1,856,374 | 963,420 | 836,113 | 56,842 | 147,716 | 151,089 | 125 | 742 | 1,773 | 14,528,860 | 652,634 | 7,387,143 | |

| | | |
|--|--------------------|----------------------------------|
| TOTAL COST TO DECOMMISSION WITH 14.42% CONTINGENCY: | \$1,856,374 | thousands of 2020 dollars |
| TOTAL NRC LICENSE TERMINATION COST IS 51.9% OR: | \$963,420 | thousands of 2020 dollars |
| SPENT FUEL MANAGEMENT COST IS 45.04% OR: | \$836,113 | thousands of 2020 dollars |
| NON-NUCLEAR DEMOLITION COST IS 3.06% OR: | \$56,842 | thousands of 2020 dollars |
| TOTAL LOW-LEVEL RADIOACTIVE WASTE VOLUME BURIED (EXCLUDING GTCC): | 151,957 | Cubic Feet |
| TOTAL GREATER THAN CLASS C RADWASTE VOLUME GENERATED: | 1,773 | Cubic Feet |
| TOTAL SCRAP METAL REMOVED: | 33,003 | Tons |
| TOTAL CRAFT LABOR REQUIREMENTS: | 652,634 | Man-hours |

End Notes:
n/a - indicates that this activity not charged as decommissioning expense
a - indicates that this activity performed by decommissioning staff
0 - indicates that this value is less than 0.5 but is non-zero
A cell containing " - " indicates a zero value

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table I-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|--|--|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| PERIOD 1a - Shutdown through Transition | | | | | | | | | | | | | | | | | | | | | |
| Period 1a Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| 1a.1.1 | SAFSTOR site characterization survey | - | - | - | - | - | - | 415 | 124 | 539 | 539 | - | - | - | - | - | - | - | - | - | - |
| 1a.1.2 | Prepare preliminary decommissioning cost | - | - | - | - | - | - | 71 | 11 | 82 | 82 | - | - | - | - | - | - | - | - | - | 556 |
| 1a.1.3 | Notification of Cessation of Operations | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.4 | Remove fuel & source material | - | - | - | - | - | - | - | - | n/a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.5 | Notification of Permanent Defueling | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.6 | Deactivate plant systems & process waste | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.7 | Prepare and submit PSDAR | - | - | - | - | - | - | 110 | 16 | 126 | 126 | - | - | - | - | - | - | - | - | - | 855 |
| 1a.1.8 | Review plant dwgs & specs. | - | - | - | - | - | - | 71 | 11 | 82 | 82 | - | - | - | - | - | - | - | - | - | 556 |
| 1a.1.9 | Perform detailed rad survey | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.10 | Estimate by-product inventory | - | - | - | - | - | - | 55 | 8 | 63 | 63 | - | - | - | - | - | - | - | - | - | 428 |
| 1a.1.11 | End product description | - | - | - | - | - | - | 55 | 8 | 63 | 63 | - | - | - | - | - | - | - | - | - | 428 |
| 1a.1.12 | Detailed by-product inventory | - | - | - | - | - | - | 82 | 12 | 95 | 95 | - | - | - | - | - | - | - | - | - | 641 |
| 1a.1.13 | Define major work sequence | - | - | - | - | - | - | 55 | 8 | 63 | 63 | - | - | - | - | - | - | - | - | - | 428 |
| 1a.1.14 | Perform SER and EA | - | - | - | - | - | - | 170 | 26 | 196 | 196 | - | - | - | - | - | - | - | - | - | 1,326 |
| 1a.1.15 | Prepare/submit Defueled Technical Specifications | - | - | - | - | - | - | 412 | 62 | 474 | 474 | - | - | - | - | - | - | - | - | - | 3,207 |
| 1a.1.16 | Perform Site-Specific Cost Study | - | - | - | - | - | - | 275 | 41 | 316 | 316 | - | - | - | - | - | - | - | - | - | 2,138 |
| 1a.1.17 | Prepare/submit Irradiated Fuel Management Plan | - | - | - | - | - | - | 55 | 8 | 63 | 63 | - | - | - | - | - | - | - | - | - | 428 |
| Activity Specifications | | | | | | | | | | | | | | | | | | | | | |
| 1a.1.18.1 | Prepare plant and facilities for SAFSTOR | - | - | - | - | - | - | 270 | 41 | 311 | 311 | - | - | - | - | - | - | - | - | - | 2,104 |
| 1a.1.18.2 | Plant systems | - | - | - | - | - | - | 229 | 34 | 263 | 263 | - | - | - | - | - | - | - | - | - | 1,782 |
| 1a.1.18.3 | Plant structures and buildings | - | - | - | - | - | - | 171 | 26 | 197 | 197 | - | - | - | - | - | - | - | - | - | 1,334 |
| 1a.1.18.4 | Waste management | - | - | - | - | - | - | 110 | 16 | 126 | 126 | - | - | - | - | - | - | - | - | - | 855 |
| 1a.1.18.5 | Facility and site dormancy | - | - | - | - | - | - | 110 | 16 | 126 | 126 | - | - | - | - | - | - | - | - | - | 855 |
| 1a.1.18 | Total | - | - | - | - | - | - | 891 | 134 | 1,024 | 1,024 | - | - | - | - | - | - | - | - | - | 6,930 |
| Detailed Work Procedures | | | | | | | | | | | | | | | | | | | | | |
| 1a.1.19.1 | Plant systems | - | - | - | - | - | - | 65 | 10 | 75 | 75 | - | - | - | - | - | - | - | - | - | 506 |
| 1a.1.19.2 | Facility closeout & dormancy | - | - | - | - | - | - | 66 | 10 | 76 | 76 | - | - | - | - | - | - | - | - | - | 513 |
| 1a.1.19 | Total | - | - | - | - | - | - | 131 | 20 | 151 | 151 | - | - | - | - | - | - | - | - | - | 1,019 |
| 1a.1.20 | Procure vacuum drying system | - | - | - | - | - | - | 5 | 1 | 6 | 6 | - | - | - | - | - | - | - | - | - | 43 |
| 1a.1.21 | Drain/de-energize non-cont. systems | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.22 | Drain & dry NSSS | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.23 | Drain/de-energize contaminated systems | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.24 | Decon/secure contaminated systems | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1 | Subtotal Period 1a Activity Costs | - | - | - | - | - | - | 2,854 | 490 | 3,345 | 3,345 | - | - | - | - | - | - | - | - | - | 18,981 |
| Period 1a Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 1a.3.1 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 1,330 | 199 | 1,529 | - | 1,529 | - | - | - | - | - | - | - | - | - |
| 1a.3.2 | Retention and Severance | - | - | - | - | - | - | 8,394 | 1,259 | 9,653 | 9,653 | - | - | - | - | - | - | - | - | - | - |
| 1a.3.3 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 1,249 | - | 1,249 | - | 1,249 | - | - | - | - | - | - | - | - | - |
| 1a.3 | Subtotal Period 1a Collateral Costs | - | - | - | - | - | - | 10,973 | 1,459 | 12,432 | 9,653 | 2,779 | - | - | - | - | - | - | - | - | - |
| Period 1a Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 1a.4.1 | Insurance | - | - | - | - | - | - | 1,660 | 166 | 1,826 | 1,826 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.2 | Property taxes | - | - | - | - | - | - | 3,623 | 362 | 3,985 | 3,985 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.3 | Health physics supplies | - | 604 | - | - | - | - | - | 151 | 755 | 755 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.4 | Heavy equipment rental | - | 753 | - | - | - | - | - | 113 | 866 | 866 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.5 | Disposal of DAW generated | - | - | 12 | 5 | - | 49 | - | 14 | 80 | 80 | - | - | - | 597 | - | - | - | 11,944 | 19 | - |
| 1a.4.6 | Plant energy budget | - | - | - | - | - | - | 1,621 | 243 | 1,864 | 1,864 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.7 | NRC Fees | - | - | - | - | - | - | 516 | 52 | 567 | 567 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.8 | Emergency Planning Fees | - | - | - | - | - | - | 2,174 | 217 | 2,392 | - | 2,392 | - | - | - | - | - | - | - | - | - |
| 1a.4.9 | Fixed Overhead | - | - | - | - | - | - | 1,440 | 216 | 1,656 | 1,656 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.10 | Spent Fuel Pool O&M | - | - | - | - | - | - | 422 | 63 | 486 | - | 486 | - | - | - | - | - | - | - | - | - |
| 1a.4.11 | ISFSI Operating Costs | - | - | - | - | - | - | 56 | 8 | 64 | - | 64 | - | - | - | - | - | - | - | - | - |
| 1a.4.12 | Railroad Track Maintenance | - | - | - | - | - | - | 63 | 9 | 72 | 72 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.13 | Security Staff Cost | - | - | - | - | - | - | 8,328 | 1,249 | 9,577 | 9,577 | - | - | - | - | - | - | - | - | - | 122,720 |
| 1a.4.14 | Utility Staff Cost | - | - | - | - | - | - | 25,478 | 3,822 | 29,300 | 29,300 | - | - | - | - | - | - | - | - | - | 400,944 |
| 1a.4 | Subtotal Period 1a Period-Dependent Costs | - | 1,357 | 12 | 5 | - | 49 | 45,381 | 6,687 | 53,491 | 50,549 | 2,942 | - | - | 597 | - | - | - | 11,944 | 19 | 523,664 |
| 1a.0 | TOTAL PERIOD 1a COST | - | 1,357 | 12 | 5 | - | 49 | 59,209 | 8,636 | 69,267 | 63,547 | 5,720 | - | - | 597 | - | - | - | 11,944 | 19 | 542,645 |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table I-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|--|--|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|---------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| PERIOD 1b - SAFSTOR Limited DECON Activities | | | | | | | | | | | | | | | | | | | | | | |
| Period 1b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Decontamination of Site Buildings | | | | | | | | | | | | | | | | | | | | | | |
| 1b.1.1.1 | Reactor | 1,199 | - | - | - | - | - | - | 599 | 1,798 | 1,798 | - | - | - | - | - | - | - | - | - | 17,003 | - |
| 1b.1.1.2 | Auxiliary | 1,244 | - | - | - | - | - | - | 622 | 1,866 | 1,866 | - | - | - | - | - | - | - | - | - | 17,950 | - |
| 1b.1.1.3 | Drum Transfer & Truck Loading Enclosure | 17 | - | - | - | - | - | - | 8 | 25 | 25 | - | - | - | - | - | - | - | - | - | 244 | - |
| 1b.1.1.4 | LLRW Storage Enclosure | 105 | - | - | - | - | - | - | 52 | 157 | 157 | - | - | - | - | - | - | - | - | - | 1,487 | - |
| 1b.1.1.5 | Radwaste | 47 | - | - | - | - | - | - | 23 | 70 | 70 | - | - | - | - | - | - | - | - | - | 669 | - |
| 1b.1.1.6 | Resin Disposal | 14 | - | - | - | - | - | - | 7 | 21 | 21 | - | - | - | - | - | - | - | - | - | 198 | - |
| 1b.1.1.7 | Fuel Handling of Aux Building | 911 | - | - | - | - | - | - | 455 | 1,366 | 1,366 | - | - | - | - | - | - | - | - | - | 12,414 | - |
| 1b.1.1 | Totals | 3,536 | - | - | - | - | - | - | 1,768 | 5,304 | 5,304 | - | - | - | - | - | - | - | - | - | 49,966 | - |
| 1b.1 | Subtotal Period 1b Activity Costs | 3,536 | - | - | - | - | - | - | 1,768 | 5,304 | 5,304 | - | - | - | - | - | - | - | - | - | 49,966 | - |
| Period 1b Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 1b.2.1 | Spent Fuel Pool Isolation | - | - | - | - | - | - | 8,450 | 1,268 | 9,718 | 9,718 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.2 | Subtotal Period 1b Additional Costs | - | - | - | - | - | - | 8,450 | 1,268 | 9,718 | 9,718 | - | - | - | - | - | - | - | - | - | - | - |
| Period 1b Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 1b.3.1 | Decon equipment | 1,055 | - | - | - | - | - | - | 158 | 1,213 | 1,213 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.3.2 | Process decommissioning water waste | 107 | - | 71 | 128 | - | 288 | - | 152 | 746 | 746 | - | - | - | 661 | - | - | - | - | - | 39,639 | 129 |
| 1b.3.3 | Process decommissioning chemical flush waste | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 1b.3.4 | Small tool allowance | - | 59 | - | - | - | - | - | 9 | 68 | 68 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.3.5 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 309 | 46 | 356 | - | 356 | - | - | - | - | - | - | - | - | - | - |
| 1b.3.6 | Retention and Severance | - | - | - | - | - | - | 2,296 | 344 | 2,640 | 2,640 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.3.7 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 311 | - | 311 | - | 311 | - | - | - | - | - | - | - | - | - | - |
| 1b.3 | Subtotal Period 1b Collateral Costs | 1,162 | 59 | 71 | 128 | - | 288 | 2,917 | 710 | 5,334 | 4,667 | 667 | - | - | 661 | - | - | - | - | - | 39,639 | 129 |
| Period 1b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 1b.4.1 | Decon supplies | 1,334 | - | - | - | - | - | - | 333 | 1,667 | 1,667 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.2 | Insurance | - | - | - | - | - | - | 414 | 41 | 455 | 455 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.3 | Property taxes | - | - | - | - | - | - | 902 | 90 | 993 | 993 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.4 | Health physics supplies | - | 438 | - | - | - | - | - | 109 | 547 | 547 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.5 | Heavy equipment rental | - | 188 | - | - | - | - | - | 28 | 216 | 216 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.6 | Disposal of DAW generated | - | - | 13 | 5 | - | 52 | - | 15 | 85 | 85 | - | - | 634 | - | - | - | - | - | - | 12,677 | 21 |
| 1b.4.7 | Plant energy budget | - | - | - | - | - | - | 404 | 61 | 465 | 465 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.8 | NRC Fees | - | - | - | - | - | - | 98 | 10 | 108 | 108 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.9 | Emergency Planning Fees | - | - | - | - | - | - | 542 | 54 | 596 | - | 596 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.10 | Fixed Overhead | - | - | - | - | - | - | 359 | 54 | 413 | 413 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.11 | Spent Fuel Pool O&M | - | - | - | - | - | - | 105 | 16 | 121 | - | 121 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.12 | ISFSI Operating Costs | - | - | - | - | - | - | 14 | 2 | 16 | - | 16 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.13 | Railroad Track Maintenance | - | - | - | - | - | - | 16 | 2 | 18 | 18 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.14 | Security Staff Cost | - | - | - | - | - | - | 2,076 | 311 | 2,388 | 2,388 | - | - | - | - | - | - | - | - | - | - | 30,596 |
| 1b.4.15 | Utility Staff Cost | - | - | - | - | - | - | 6,714 | 1,007 | 7,722 | 7,722 | - | - | - | - | - | - | - | - | - | - | 105,271 |
| 1b.4 | Subtotal Period 1b Period-Dependent Costs | 1,334 | 626 | 13 | 5 | - | 52 | 11,645 | 2,135 | 15,809 | 15,076 | 733 | - | - | 634 | - | - | - | - | - | 12,677 | 21 |
| 1b.0 | TOTAL PERIOD 1b COST | 6,032 | 684 | 84 | 133 | - | 340 | 23,012 | 5,880 | 36,165 | 34,764 | 1,401 | - | - | 1,295 | - | - | - | - | - | 52,317 | 50,115 |
| PERIOD 1c - Preparations for SAFSTOR Dormancy | | | | | | | | | | | | | | | | | | | | | | |
| Period 1c Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| 1c.1.1 | Prepare support equipment for storage | - | 527 | - | - | - | - | - | 79 | 606 | 606 | - | - | - | - | - | - | - | - | - | 3,000 | - |
| 1c.1.2 | Install containment pressure equal. lines | - | 54 | - | - | - | - | - | 8 | 62 | 62 | - | - | - | - | - | - | - | - | - | 700 | - |
| 1c.1.3 | Interim survey prior to dormancy | - | - | - | - | - | - | 733 | 220 | 953 | 953 | - | - | - | - | - | - | - | - | - | 12,801 | - |
| 1c.1.4 | Secure building accesses | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 1c.1.5 | Prepare & submit interim report | - | - | - | - | - | - | 32 | 5 | 37 | 37 | - | - | - | - | - | - | - | - | - | - | 249 |
| 1c.1 | Subtotal Period 1c Activity Costs | - | 581 | - | - | - | - | 765 | 312 | 1,658 | 1,658 | - | - | - | - | - | - | - | - | - | 16,501 | 249 |
| Period 1c Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 1c.3.1 | Process decommissioning water waste | 91 | - | 60 | 109 | - | 245 | - | 129 | 634 | 634 | - | - | - | 561 | - | - | - | - | - | 33,685 | 109 |
| 1c.3.3 | Small tool allowance | - | 5 | - | - | - | - | - | 1 | 6 | 6 | - | - | - | - | - | - | - | - | - | - | - |
| 1c.3.4 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 90 | 13 | 103 | - | 103 | - | - | - | - | - | - | - | - | - | - |
| 1c.3.5 | Retention and Severance | - | - | - | - | - | - | 1,722 | 258 | 1,980 | 1,980 | - | - | - | - | - | - | - | - | - | - | - |
| 1c.3.6 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 311 | - | 311 | - | 311 | - | - | - | - | - | - | - | - | - | - |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table I-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|---|--------------|--------------|-----------------|-----------------|---------------------------|---------------------|---------------|-------------------|----------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| 1c.3 | Subtotal Period 1c Collateral Costs | 91 | 5 | 60 | 109 | - | 245 | 2,123 | 401 | 3,034 | 2,619 | 415 | - | - | 561 | - | - | - | 33,685 | 109 | - |
| Period 1c Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 1c.4.1 | Insurance | - | - | - | - | - | - | 414 | 41 | 455 | 455 | - | - | - | - | - | - | - | - | - | - |
| 1c.4.2 | Property taxes | - | - | - | - | - | - | 901 | 90 | 991 | 991 | - | - | - | - | - | - | - | - | - | - |
| 1c.4.3 | Health physics supplies | - | 248 | - | - | - | - | - | 62 | 309 | 309 | - | - | - | - | - | - | - | - | - | - |
| 1c.4.4 | Heavy equipment rental | - | 188 | - | - | - | - | - | 28 | 216 | 216 | - | - | - | - | - | - | - | - | - | - |
| 1c.4.5 | Disposal of DAW generated | - | - | 3 | 1 | - | 13 | - | 4 | 20 | 20 | - | - | - | 152 | - | - | - | 3,039 | 5 | - |
| 1c.4.6 | Plant energy budget | - | - | - | - | - | - | 404 | 61 | 465 | 465 | - | - | - | - | - | - | - | - | - | - |
| 1c.4.7 | NRC Fees | - | - | - | - | - | - | 98 | 10 | 108 | 108 | - | - | - | - | - | - | - | - | - | - |
| 1c.4.8 | Emergency Planning Fees | - | - | - | - | - | - | 542 | 54 | 596 | - | 596 | - | - | - | - | - | - | - | - | - |
| 1c.4.9 | Fixed Overhead | - | - | - | - | - | - | 359 | 54 | 413 | 413 | - | - | - | - | - | - | - | - | - | - |
| 1c.4.10 | Spent Fuel Pool O&M | - | - | - | - | - | - | 105 | 16 | 121 | - | 121 | - | - | - | - | - | - | - | - | - |
| 1c.4.11 | ISFSI Operating Costs | - | - | - | - | - | - | 14 | 2 | 16 | - | 16 | - | - | - | - | - | - | - | - | - |
| 1c.4.12 | Railroad Track Maintenance | - | - | - | - | - | - | 16 | 2 | 18 | 18 | - | - | - | - | - | - | - | - | - | - |
| 1c.4.13 | Security Staff Cost | - | - | - | - | - | - | 2,076 | 311 | 2,388 | 2,388 | - | - | - | - | - | - | - | - | - | 30,596 |
| 1c.4.14 | Utility Staff Cost | - | - | - | - | - | - | 6,714 | 1,007 | 7,722 | 7,722 | - | - | - | - | - | - | - | - | - | 105,271 |
| 1c.4 | Subtotal Period 1c Period-Dependent Costs | - | 435 | 3 | 1 | - | 13 | 11,643 | 1,742 | 13,838 | 13,104 | 733 | - | - | 152 | - | - | - | 3,039 | 5 | 135,867 |
| 1c.0 | TOTAL PERIOD 1c COST | 91 | 1,021 | 63 | 110 | - | 257 | 14,531 | 2,456 | 18,530 | 17,382 | 1,148 | - | - | 713 | - | - | - | 36,724 | 16,615 | 136,116 |
| PERIOD 1 TOTALS | | 6,123 | 3,062 | 159 | 248 | - | 646 | 96,752 | 16,972 | 123,961 | 115,692 | 8,269 | - | - | 2,605 | - | - | - | 100,985 | 66,750 | 814,628 |
| PERIOD 2a - SAFSTOR Dormancy with Wet Spent Fuel Storage | | | | | | | | | | | | | | | | | | | | | |
| Period 2a Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| 2a.1.1 | Quarterly Inspection | - | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - |
| 2a.1.2 | Semi-annual environmental survey | - | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - |
| 2a.1.3 | Prepare reports | - | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - |
| 2a.1.4 | Bituminous roof replacement | - | - | - | - | - | - | 223 | 33 | 256 | 256 | - | - | - | - | - | - | - | - | - | - |
| 2a.1.5 | Maintenance supplies | - | - | - | - | - | - | 349 | 87 | 437 | 437 | - | - | - | - | - | - | - | - | - | - |
| 2a.1 | Subtotal Period 2a Activity Costs | - | - | - | - | - | - | 572 | 121 | 693 | 693 | - | - | - | - | - | - | - | - | - | - |
| Period 2a Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 2a.2.1 | Security Modifications | - | - | - | - | - | - | 4,348 | 652 | 5,000 | 5,000 | - | - | - | - | - | - | - | - | - | - |
| 2a.2 | Subtotal Period 2a Additional Costs | - | - | - | - | - | - | 4,348 | 652 | 5,000 | 5,000 | - | - | - | - | - | - | - | - | - | - |
| Period 2a Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 2a.3.1 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 64,672 | 9,701 | 74,373 | - | 74,373 | - | - | - | - | - | - | - | - | - |
| 2a.3.2 | Retention and Severance | - | - | - | - | - | - | 11,054 | 1,658 | 12,712 | 12,712 | - | - | - | - | - | - | - | - | - | - |
| 2a.3.3 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 3,128 | - | 3,128 | - | 3,128 | - | - | - | - | - | - | - | - | - |
| 2a.3 | Subtotal Period 2a Collateral Costs | - | - | - | - | - | - | 78,854 | 11,359 | 90,213 | 12,712 | 77,501 | - | - | - | - | - | - | - | - | - |
| Period 2a Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 2a.4.1 | Insurance | - | - | - | - | - | - | 1,213 | 121 | 1,334 | 1,334 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.2 | Property taxes | - | - | - | - | - | - | 9,065 | 907 | 9,972 | 9,972 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.3 | Health physics supplies | - | 617 | - | - | - | - | - | 154 | 771 | 771 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.4 | Disposal of DAW generated | - | - | 11 | 5 | - | 47 | - | 14 | 77 | 77 | - | - | - | 576 | - | - | - | 11,523 | 19 | - |
| 2a.4.5 | Plant energy budget | - | - | - | - | - | - | 812 | 122 | 934 | 934 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.6 | NRC Fees | - | - | - | - | - | - | 536 | 54 | 590 | 590 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.7 | Emergency Planning Fees | - | - | - | - | - | - | 4,653 | 465 | 5,119 | - | 5,119 | - | - | - | - | - | - | - | - | - |
| 2a.4.8 | Fixed Overhead | - | - | - | - | - | - | 2,979 | 447 | 3,426 | 3,426 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.9 | Spent Fuel Pool O&M | - | - | - | - | - | - | 1,057 | 159 | 1,216 | - | 1,216 | - | - | - | - | - | - | - | - | - |
| 2a.4.10 | ISFSI Operating Costs | - | - | - | - | - | - | 140 | 21 | 161 | - | 161 | - | - | - | - | - | - | - | - | - |
| 2a.4.11 | Railroad Track Maintenance | - | - | - | - | - | - | 385 | 58 | 443 | 443 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.12 | Security Staff Cost | - | - | - | - | - | - | 19,158 | 2,874 | 22,032 | 15,863 | 6,169 | - | - | - | - | - | - | - | - | 281,262 |
| 2a.4.13 | Utility Staff Cost | - | - | - | - | - | - | 13,370 | 2,006 | 15,376 | 12,900 | 2,476 | - | - | - | - | - | - | - | - | 205,738 |
| 2a.4 | Subtotal Period 2a Period-Dependent Costs | - | 617 | 11 | 5 | - | 47 | 53,370 | 7,400 | 61,450 | 46,309 | 15,140 | - | - | 576 | - | - | - | 11,523 | 19 | 486,999 |
| 2a.0 | TOTAL PERIOD 2a COST | - | 617 | 11 | 5 | - | 47 | 137,143 | 19,532 | 157,355 | 64,714 | 92,641 | - | - | 576 | - | - | - | 11,523 | 19 | 486,999 |
| PERIOD 2b - SAFSTOR Dormancy with Dry Spent Fuel Storage | | | | | | | | | | | | | | | | | | | | | |
| Period 2b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| 2b.1.1 | Quarterly Inspection | - | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - |
| 2b.1.2 | Semi-annual environmental survey | - | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - |
| 2b.1.3 | Prepare reports | - | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - |
| 2b.1.4 | Bituminous roof replacement | - | - | - | - | - | - | 4,402 | 660 | 5,063 | 5,063 | - | - | - | - | - | - | - | - | - | - |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table I-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|-----------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| Period 2b Direct Decommissioning Activities (continued) | | | | | | | | | | | | | | | | | | | | | | |
| 2b.1.5 | Maintenance supplies | - | - | - | - | - | - | 6,902 | 1,726 | 8,628 | 8,628 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.1 | Subtotal Period 2b Activity Costs | - | - | - | - | - | - | 11,305 | 2,386 | 13,691 | 13,691 | - | - | - | - | - | - | - | - | - | - | |
| Period 2b Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 2b.3.1 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 136,259 | 20,439 | 156,698 | - | 156,698 | - | - | - | - | - | - | - | - | - | - |
| 2b.3.2 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 61,783 | - | 61,783 | - | 61,783 | - | - | - | - | - | - | - | - | - | - |
| 2b.3 | Subtotal Period 2b Collateral Costs | - | - | - | - | - | - | 198,042 | 20,439 | 218,481 | - | 218,481 | - | - | - | - | - | - | - | - | - | - |
| Period 2b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 2b.4.1 | Insurance | - | - | - | - | - | - | 23,951 | 2,395 | 26,346 | 26,346 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.2 | Property taxes | - | - | - | - | - | - | 179,063 | 17,906 | 196,969 | 196,969 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.3 | Health physics supplies | - | 5,618 | - | - | - | - | - | 1,404 | 7,022 | 7,022 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.4 | Disposal of DAW generated | - | - | 101 | 41 | - | 421 | - | 122 | 685 | 685 | - | - | - | 5,109 | - | - | - | - | 102,180 | 167 | - |
| 2b.4.5 | Plant energy budget | - | - | - | - | - | - | 8,019 | 1,203 | 9,222 | 9,222 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.6 | NRC Fees | - | - | - | - | - | - | 10,191 | 1,019 | 11,211 | 11,211 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.7 | Emergency Planning Fees | - | - | - | - | - | - | 3,667 | 367 | 4,033 | - | 4,033 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.8 | Fixed Overhead | - | - | - | - | - | - | 8,059 | 1,209 | 9,268 | 9,268 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.9 | ISFSI Operating Costs | - | - | - | - | - | - | 2,768 | 415 | 3,183 | - | 3,183 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.10 | Railroad Track Maintenance | - | - | - | - | - | - | 3,092 | 464 | 3,556 | 3,556 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.11 | Security Staff Cost | - | - | - | - | - | - | 138,043 | 20,706 | 158,749 | 34,925 | 123,825 | - | - | - | - | - | - | - | - | - | 1,851,793 |
| 2b.4.12 | Utility Staff Cost | - | - | - | - | - | - | 67,547 | 10,132 | 77,680 | 48,783 | 28,897 | - | - | - | - | - | - | - | - | - | 1,028,774 |
| 2b.4 | Subtotal Period 2b Period-Dependent Costs | - | 5,618 | 101 | 41 | - | 421 | 444,401 | 57,343 | 507,924 | 347,987 | 159,938 | - | - | 5,109 | - | - | - | - | 102,180 | 167 | 2,880,567 |
| 2b.0 | TOTAL PERIOD 2b COST | - | 5,618 | 101 | 41 | - | 421 | 653,748 | 80,167 | 740,096 | 361,678 | 378,419 | - | - | 5,109 | - | - | - | - | 102,180 | 167 | 2,880,567 |
| PERIOD 2 TOTALS | | - | 6,235 | 113 | 46 | - | 468 | 790,891 | 99,699 | 897,452 | 426,392 | 471,060 | - | - | 5,685 | - | - | - | - | 113,703 | 185 | 3,367,566 |
| PERIOD 3a - Reactivate Site Following SAFSTOR Dormancy | | | | | | | | | | | | | | | | | | | | | | |
| Period 3a Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| 3a.1.1 | Prepare preliminary decommissioning cost | - | - | - | - | - | - | 71 | 11 | 82 | 82 | - | - | - | - | - | - | - | - | - | - | 556 |
| 3a.1.2 | Review plant dwgs & specs. | - | - | - | - | - | - | 253 | 38 | 291 | 291 | - | - | - | - | - | - | - | - | - | - | 1,967 |
| 3a.1.3 | Perform detailed rad survey | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 3a.1.4 | End product description | - | - | - | - | - | - | 55 | 8 | 63 | 63 | - | - | - | - | - | - | - | - | - | - | 428 |
| 3a.1.5 | Detailed by-product inventory | - | - | - | - | - | - | 71 | 11 | 82 | 82 | - | - | - | - | - | - | - | - | - | - | 556 |
| 3a.1.6 | Define major work sequence | - | - | - | - | - | - | 412 | 62 | 474 | 474 | - | - | - | - | - | - | - | - | - | - | 3,207 |
| 3a.1.7 | Perform SER and EA | - | - | - | - | - | - | 170 | 26 | 196 | 196 | - | - | - | - | - | - | - | - | - | - | 1,326 |
| 3a.1.8 | Perform Site-Specific Cost Study | - | - | - | - | - | - | 275 | 41 | 316 | 316 | - | - | - | - | - | - | - | - | - | - | 2,138 |
| Activity Specifications | | | | | | | | | | | | | | | | | | | | | | |
| 3a.1.9.1 | Re-activate plant & temporary facilities | - | - | - | - | - | - | 405 | 61 | 466 | 419 | - | 47 | - | - | - | - | - | - | - | - | 3,151 |
| 3a.1.9.2 | Plant systems | - | - | - | - | - | - | 229 | 34 | 263 | 237 | - | 26 | - | - | - | - | - | - | - | - | 1,782 |
| 3a.1.9.3 | Reactor internals | - | - | - | - | - | - | 390 | 59 | 449 | 449 | - | - | - | - | - | - | - | - | - | - | 3,036 |
| 3a.1.9.4 | Reactor vessel | - | - | - | - | - | - | 357 | 54 | 411 | 411 | - | - | - | - | - | - | - | - | - | - | 2,779 |
| 3a.1.9.5 | Biological shield | - | - | - | - | - | - | 27 | 4 | 32 | 32 | - | - | - | - | - | - | - | - | - | - | 214 |
| 3a.1.9.6 | Steam generators | - | - | - | - | - | - | 171 | 26 | 197 | 197 | - | - | - | - | - | - | - | - | - | - | 1,334 |
| 3a.1.9.7 | Reinforced concrete | - | - | - | - | - | - | 88 | 13 | 101 | 51 | - | 51 | - | - | - | - | - | - | - | - | 684 |
| 3a.1.9.8 | Main Turbine | - | - | - | - | - | - | 22 | 3 | 25 | - | - | 25 | - | - | - | - | - | - | - | - | 171 |
| 3a.1.9.9 | Main Condensers | - | - | - | - | - | - | 22 | 3 | 25 | - | - | 25 | - | - | - | - | - | - | - | - | 171 |
| 3a.1.9.10 | Plant structures & buildings | - | - | - | - | - | - | 171 | 26 | 197 | 99 | - | 99 | - | - | - | - | - | - | - | - | 1,334 |
| 3a.1.9.11 | Waste management | - | - | - | - | - | - | 253 | 38 | 291 | 291 | - | - | - | - | - | - | - | - | - | - | 1,967 |
| 3a.1.9.12 | Facility & site closeout | - | - | - | - | - | - | 49 | 7 | 57 | 28 | - | 28 | - | - | - | - | - | - | - | - | 385 |
| 3a.1.9 | Total | - | - | - | - | - | - | 2,186 | 328 | 2,514 | 2,213 | - | 301 | - | - | - | - | - | - | - | - | 17,009 |
| Planning & Site Preparations | | | | | | | | | | | | | | | | | | | | | | |
| 3a.1.10 | Prepare dismantling sequence | - | - | - | - | - | - | 132 | 20 | 152 | 152 | - | - | - | - | - | - | - | - | - | - | 1,026 |
| 3a.1.11 | Plant prep. & temp. svces | - | - | - | - | - | - | 3,500 | 525 | 4,025 | 4,025 | - | - | - | - | - | - | - | - | - | - | - |
| 3a.1.12 | Design water clean-up system | - | - | - | - | - | - | 77 | 12 | 88 | 88 | - | - | - | - | - | - | - | - | - | - | 599 |
| 3a.1.13 | Rigging/Cont. Cntrl Envlp/setting/etc. | - | - | - | - | - | - | 2,400 | 360 | 2,760 | 2,760 | - | - | - | - | - | - | - | - | - | - | - |
| 3a.1.14 | Procure casks/liners & containers | - | - | - | - | - | - | 68 | 10 | 78 | 78 | - | - | - | - | - | - | - | - | - | - | 526 |
| 3a.1 | Subtotal Period 3a Activity Costs | - | - | - | - | - | - | 9,670 | 1,451 | 11,121 | 10,820 | - | 301 | - | - | - | - | - | - | - | - | 29,336 |
| Period 3a Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3a.2.1 | Site Characterization | - | - | - | - | - | - | 1,505 | 451 | 1,956 | 1,956 | - | - | - | - | - | - | - | - | - | 8,988 | 3,563 |
| 3a.2.2 | Mixed/Hazardous Waste | - | - | 353 | 94 | 178 | - | - | 76 | 702 | 702 | - | - | 6,132 | - | - | - | - | - | 351,977 | 2,348 | - |
| 3a.2.3 | Asbestos Abatement | - | 2,526 | 3 | 150 | - | 1,369 | - | 996 | 5,044 | 5,044 | - | - | - | 12,843 | - | - | - | - | 166,959 | 20,907 | - |
| 3a.2 | Subtotal Period 3a Additional Costs | - | 2,526 | 356 | 244 | 178 | 1,369 | 1,505 | 1,524 | 7,702 | 7,702 | - | - | 6,132 | 12,843 | - | - | - | - | 518,936 | 32,243 | 3,563 |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table I-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| Period 3a Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 3a.3.1 | Small tool allowance | - | 34 | - | - | - | - | - | 5 | 39 | 39 | - | - | - | - | - | - | - | - | - | - |
| 3a.3.2 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 39,506 | 5,926 | 45,431 | - | 45,431 | - | - | - | - | - | - | - | - | - |
| 3a.3.3 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 1,249 | - | 1,249 | - | 1,249 | - | - | - | - | - | - | - | - | - |
| 3a.3 | Subtotal Period 3a Collateral Costs | - | 34 | - | - | - | - | 40,755 | 5,931 | 46,720 | 39 | 46,680 | - | - | - | - | - | - | - | - | - |
| Period 3a Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 3a.4.1 | Insurance | - | - | - | - | - | - | 484 | 48 | 533 | 307 | 225 | - | - | - | - | - | - | - | - | - |
| 3a.4.2 | Property taxes | - | - | - | - | - | - | 3,546 | 355 | 3,900 | 2,500 | 1,400 | - | - | - | - | - | - | - | - | - |
| 3a.4.3 | Health physics supplies | - | 641 | - | - | - | - | - | 160 | 802 | 802 | - | - | - | - | - | - | - | - | - | - |
| 3a.4.4 | Heavy equipment rental | - | 753 | - | - | - | - | - | 113 | 866 | 866 | - | - | - | - | - | - | - | - | - | - |
| 3a.4.5 | Disposal of DAW generated | - | - | 10 | 4 | - | 40 | - | 11 | 64 | 64 | - | - | - | 481 | - | - | - | 9,613 | 16 | - |
| 3a.4.6 | Plant energy budget | - | - | - | - | - | - | 1,621 | 243 | 1,864 | 1,864 | - | - | - | - | - | - | - | - | - | - |
| 3a.4.7 | NRC ISFSI Fees | - | - | - | - | - | - | 120 | 12 | 132 | - | 132 | - | - | - | - | - | - | - | - | - |
| 3a.4.8 | NRC Fees | - | - | - | - | - | - | 260 | 26 | 286 | 286 | - | - | - | - | - | - | - | - | - | - |
| 3a.4.9 | Emergency Planning Fees | - | - | - | - | - | - | 74 | 7 | 82 | - | 82 | - | - | - | - | - | - | - | - | - |
| 3a.4.10 | Fixed Overhead | - | - | - | - | - | - | 1,440 | 216 | 1,656 | 1,656 | - | - | - | - | - | - | - | - | - | - |
| 3a.4.11 | ISFSI Operating Costs | - | - | - | - | - | - | 56 | 8 | 64 | - | 64 | - | - | - | - | - | - | - | - | - |
| 3a.4.12 | Railroad Track Maintenance | - | - | - | - | - | - | 63 | 9 | 72 | 72 | - | - | - | - | - | - | - | - | - | - |
| 3a.4.13 | Security Staff Cost | - | - | - | - | - | - | 368 | 55 | 424 | 424 | - | - | - | - | - | - | - | - | - | 6,240 |
| 3a.4.14 | Utility Staff Cost | - | - | - | - | - | - | 12,056 | 1,808 | 13,864 | 13,379 | 485 | - | - | - | - | - | - | - | - | 199,680 |
| 3a.4 | Subtotal Period 3a Period-Dependent Costs | - | 1,394 | 10 | 4 | - | 40 | 20,088 | 3,074 | 24,609 | 22,220 | 2,388 | - | - | 481 | - | - | - | 9,613 | 16 | 205,920 |
| 3a.0 | TOTAL PERIOD 3a COST | - | 3,954 | 366 | 248 | 178 | 1,409 | 72,018 | 11,979 | 90,151 | 40,781 | 49,069 | 301 | 6,132 | 13,324 | - | - | - | 528,549 | 32,259 | 238,819 |
| PERIOD 3b - Decommissioning Preparations | | | | | | | | | | | | | | | | | | | | | |
| Period 3b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| Detailed Work Procedures | | | | | | | | | | | | | | | | | | | | | |
| 3b.1.1.1 | Plant systems | - | - | - | - | - | - | 260 | 39 | 299 | 269 | - | 30 | - | - | - | - | - | - | - | 2,024 |
| 3b.1.1.2 | Reactor internals | - | - | - | - | - | - | 137 | 21 | 158 | 158 | - | - | - | - | - | - | - | - | - | 1,069 |
| 3b.1.1.3 | Remaining buildings | - | - | - | - | - | - | 74 | 11 | 85 | 21 | - | 64 | - | - | - | - | - | - | - | 577 |
| 3b.1.1.4 | CRD cooling assembly | - | - | - | - | - | - | 55 | 8 | 63 | 63 | - | - | - | - | - | - | - | - | - | 428 |
| 3b.1.1.5 | CRD housings & ICI tubes | - | - | - | - | - | - | 55 | 8 | 63 | 63 | - | - | - | - | - | - | - | - | - | 428 |
| 3b.1.1.6 | Incore instrumentation | - | - | - | - | - | - | 55 | 8 | 63 | 63 | - | - | - | - | - | - | - | - | - | 428 |
| 3b.1.1.7 | Reactor vessel | - | - | - | - | - | - | 199 | 30 | 229 | 229 | - | - | - | - | - | - | - | - | - | 1,552 |
| 3b.1.1.8 | Facility closeout | - | - | - | - | - | - | 66 | 10 | 76 | 38 | - | 38 | - | - | - | - | - | - | - | 513 |
| 3b.1.1.9 | Missile shields | - | - | - | - | - | - | 25 | 4 | 28 | 28 | - | - | - | - | - | - | - | - | - | 192 |
| 3b.1.1.10 | Biological shield | - | - | - | - | - | - | 66 | 10 | 76 | 76 | - | - | - | - | - | - | - | - | - | 513 |
| 3b.1.1.11 | Steam generators | - | - | - | - | - | - | 253 | 38 | 291 | 291 | - | - | - | - | - | - | - | - | - | 1,967 |
| 3b.1.1.12 | Reinforced concrete | - | - | - | - | - | - | 55 | 8 | 63 | 32 | - | 32 | - | - | - | - | - | - | - | 428 |
| 3b.1.1.13 | Main Turbine | - | - | - | - | - | - | 86 | 13 | 99 | - | - | 99 | - | - | - | - | - | - | - | 667 |
| 3b.1.1.14 | Main Condensers | - | - | - | - | - | - | 86 | 13 | 99 | - | - | 99 | - | - | - | - | - | - | - | 667 |
| 3b.1.1.15 | Auxiliary building | - | - | - | - | - | - | 150 | 23 | 173 | 155 | - | 17 | - | - | - | - | - | - | - | 1,167 |
| 3b.1.1.16 | Reactor building | - | - | - | - | - | - | 150 | 23 | 173 | 155 | - | 17 | - | - | - | - | - | - | - | 1,167 |
| 3b.1.1 | Total | - | - | - | - | - | - | 1,772 | 266 | 2,038 | 1,643 | - | 395 | - | - | - | - | - | - | - | 13,787 |
| 3b.1 | Subtotal Period 3b Activity Costs | - | - | - | - | - | - | 1,772 | 266 | 2,038 | 1,643 | - | 395 | - | - | - | - | - | - | - | 13,787 |
| Period 3b Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 3b.3.1 | Decon equipment | 1,055 | - | - | - | - | - | - | 158 | 1,213 | 1,213 | - | - | - | - | - | - | - | - | - | - |
| 3b.3.2 | DOC staff relocation expenses | - | - | - | - | - | - | 1,264 | 190 | 1,454 | 1,454 | - | - | - | - | - | - | - | - | - | - |
| 3b.3.3 | Pipe cutting equipment | - | 1,200 | - | - | - | - | - | 180 | 1,380 | 1,380 | - | - | - | - | - | - | - | - | - | - |
| 3b.3.4 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 623 | - | 623 | - | 623 | - | - | - | - | - | - | - | - | - |
| 3b.3 | Subtotal Period 3b Collateral Costs | 1,055 | 1,200 | - | - | - | - | 1,887 | 528 | 4,669 | 4,047 | 623 | - | - | - | - | - | - | - | - | - |
| Period 3b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 3b.4.1 | Decon supplies | 38 | - | - | - | - | - | - | 9 | 47 | 47 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.2 | Insurance | - | - | - | - | - | - | 241 | 24 | 266 | 266 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.3 | Property taxes | - | - | - | - | - | - | 1,667 | 167 | 1,834 | 1,175 | 658 | - | - | - | - | - | - | - | - | - |
| 3b.4.4 | Health physics supplies | - | 274 | - | - | - | - | - | 68 | 342 | 342 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.5 | Heavy equipment rental | - | 375 | - | - | - | - | - | 56 | 432 | 432 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.6 | Disposal of DAW generated | - | - | 5 | 2 | - | 22 | - | 6 | 35 | 35 | - | - | - | 264 | - | - | - | 5,286 | 9 | - |
| 3b.4.7 | Plant energy budget | - | - | - | - | - | - | 808 | 121 | 930 | 930 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.8 | NRC ISFSI Fees | - | - | - | - | - | - | 60 | 6 | 66 | - | 66 | - | - | - | - | - | - | - | - | - |
| 3b.4.9 | NRC Fees | - | - | - | - | - | - | 129 | 13 | 142 | 142 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.10 | Emergency Planning Fees | - | - | - | - | - | - | 37 | 4 | 41 | - | 41 | - | - | - | - | - | - | - | - | - |
| 3b.4.11 | Fixed Overhead | - | - | - | - | - | - | 718 | 108 | 826 | 826 | - | - | - | - | - | - | - | - | - | - |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table I-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|--|---|--------------|--------------|-----------------|-----------------|---------------------------|---------------------|---------------|-------------------|----------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| Period 3b Period-Dependent Costs (continued) | | | | | | | | | | | | | | | | | | | | | |
| 3b.4.12 | ISFSI Operating Costs | - | - | - | - | - | - | 28 | 4 | 32 | - | 32 | - | - | - | - | - | - | - | - | - |
| 3b.4.13 | Railroad Track Maintenance | - | - | - | - | - | - | 31 | 5 | 36 | 36 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.14 | Security Staff Cost | - | - | - | - | - | - | 184 | 28 | 211 | 211 | - | - | - | - | - | - | - | - | - | 3,111 |
| 3b.4.15 | DOC Staff Cost | - | - | - | - | - | - | 3,727 | 559 | 4,287 | 4,287 | - | - | - | - | - | - | - | - | - | 42,523 |
| 3b.4.16 | Utility Staff Cost | - | - | - | - | - | - | 6,011 | 902 | 6,913 | 6,671 | 242 | - | - | - | - | - | - | - | - | 99,566 |
| 3b.4 | Subtotal Period 3b Period-Dependent Costs | 38 | 649 | 5 | 2 | - | 22 | 13,643 | 2,080 | 16,439 | 15,400 | 1,039 | - | - | 264 | - | - | - | 5,286 | 9 | 145,201 |
| 3b.0 | TOTAL PERIOD 3b COST | 1,092 | 1,849 | 5 | 2 | - | 22 | 17,301 | 2,874 | 23,146 | 21,089 | 1,661 | 395 | - | 264 | - | - | - | 5,286 | 9 | 158,988 |
| PERIOD 3 TOTALS | | 1,092 | 5,803 | 371 | 250 | 178 | 1,430 | 89,319 | 14,853 | 113,297 | 61,871 | 50,730 | 696 | 6,132 | 13,588 | - | - | - | 533,835 | 32,267 | 397,807 |
| PERIOD 4a - Large Component Removal | | | | | | | | | | | | | | | | | | | | | |
| Period 4a Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| Nuclear Steam Supply System Removal | | | | | | | | | | | | | | | | | | | | | |
| 4a.1.1.1 | Reactor Coolant Piping | 11 | 42 | 10 | 11 | 66 | 94 | - | 52 | 285 | 285 | - | - | 240 | 254 | - | - | - | 33,680 | 778 | - |
| 4a.1.1.2 | Pressurizer Relief Tank | 5 | 19 | 6 | 7 | 44 | 62 | - | 31 | 174 | 174 | - | - | 160 | 169 | - | - | - | 22,441 | 352 | - |
| 4a.1.1.3 | Reactor Coolant Pumps & Motors | 13 | 60 | 46 | 85 | - | 463 | - | 155 | 822 | 822 | - | - | - | 2,332 | - | - | - | 295,800 | 1,226 | 80 |
| 4a.1.1.4 | Pressurizer | - | 77 | 382 | 91 | - | 776 | - | 265 | 1,591 | 1,591 | - | - | - | 2,196 | - | - | - | 158,199 | 1,346 | 750 |
| 4a.1.1.5 | Steam Generators | - | 3,307 | 1,690 | 1,743 | 2,409 | 3,885 | - | 2,590 | 15,625 | 15,625 | - | - | 18,672 | 10,990 | - | - | - | 1,581,180 | 10,253 | 2,250 |
| 4a.1.1.6 | CRDMs/ICIs/Service Structure Removal | 63 | 248 | 205 | 44 | 326 | 454 | - | 283 | 1,623 | 1,623 | - | - | 2,138 | 2,146 | - | - | - | 165,025 | 4,449 | - |
| 4a.1.1.7 | Reactor Vessel Internals | 51 | 4,650 | 13,353 | 862 | - | 7,848 | 278 | 11,032 | 38,074 | 38,074 | - | - | - | 1,174 | - | 673 | - | 167,337 | 22,373 | 1,053 |
| 4a.1.1.8 | Reactor Vessel | - | 5,835 | 1,653 | 442 | - | 3,268 | 278 | 6,576 | 18,053 | 18,053 | - | - | - | 9,245 | - | - | - | 579,324 | 22,373 | 1,053 |
| 4a.1.1 | Totals | 144 | 14,237 | 17,346 | 3,284 | 2,845 | 16,851 | 556 | 20,984 | 76,247 | 76,247 | - | - | 21,210 | 28,505 | - | 673 | - | 3,002,986 | 63,151 | 5,187 |
| Removal of Major Equipment | | | | | | | | | | | | | | | | | | | | | |
| 4a.1.2 | Main Turbine/Generator | - | 292 | 116 | 35 | 555 | - | - | 173 | 1,170 | 1,170 | - | - | 2,243 | - | - | - | - | 134,601 | 4,116 | - |
| 4a.1.3 | Main Condensers | - | 2,510 | 79 | 33 | 742 | - | - | 752 | 4,115 | 4,115 | - | - | 4,000 | - | - | - | - | 180,000 | 34,978 | - |
| Cascading Costs from Clean Building Demolition | | | | | | | | | | | | | | | | | | | | | |
| 4a.1.4.1 | Reactor | - | 794 | - | - | - | - | - | 119 | 913 | 913 | - | - | - | - | - | - | - | - | 7,589 | - |
| 4a.1.4.2 | Auxiliary | - | 221 | - | - | - | - | - | 33 | 254 | 254 | - | - | - | - | - | - | - | - | 1,309 | - |
| 4a.1.4.3 | Radwaste | - | 9 | - | - | - | - | - | 1 | 10 | 10 | - | - | - | - | - | - | - | - | 65 | - |
| 4a.1.4 | Totals | - | 1,023 | - | - | - | - | - | 154 | 1,177 | 1,177 | - | - | - | - | - | - | - | - | 8,963 | - |
| Disposal of Plant Systems | | | | | | | | | | | | | | | | | | | | | |
| 4a.1.5.1 | Admin Bldg Ventilation | - | 6 | - | - | - | - | - | 1 | 7 | - | - | 7 | - | - | - | - | - | - | 90 | - |
| 4a.1.5.2 | Air Removal | - | 29 | - | - | - | - | - | 4 | 33 | - | - | 33 | - | - | - | - | - | - | 422 | - |
| 4a.1.5.3 | Auxiliary Feedwater | - | 46 | - | - | - | - | - | 7 | 53 | - | - | 53 | - | - | - | - | - | - | 676 | - |
| 4a.1.5.4 | Auxiliary Feedwater - RCA | - | 38 | 0 | 1 | 30 | - | - | 14 | 84 | 84 | - | - | 178 | - | - | - | - | 7,214 | 486 | - |
| 4a.1.5.5 | Bleed Steam | - | 90 | - | - | - | - | - | 13 | 103 | - | - | 103 | - | - | - | - | - | - | 1,331 | - |
| 4a.1.5.6 | Caustic Addition - RCA | - | 40 | 0 | 2 | 40 | - | - | 16 | 99 | 99 | - | - | 240 | - | - | - | - | 9,761 | 468 | - |
| 4a.1.5.7 | Chemical Feed | - | 17 | - | - | - | - | - | 3 | 20 | - | - | 20 | - | - | - | - | - | - | 261 | - |
| 4a.1.5.8 | Chemical Feed - RCA | - | 3 | 0 | 0 | 3 | - | - | 1 | 7 | 7 | - | - | 16 | - | - | - | - | 634 | 31 | - |
| 4a.1.5.9 | Circulating Water | - | 27 | - | - | - | - | - | 4 | 32 | - | - | 32 | - | - | - | - | - | - | 401 | - |
| 4a.1.5.10 | Condensate | - | 525 | - | - | - | - | - | 79 | 603 | - | - | 603 | - | - | - | - | - | - | 7,537 | - |
| 4a.1.5.11 | Condensate Polishing | - | 208 | - | - | - | - | - | 31 | 239 | - | - | 239 | - | - | - | - | - | - | 2,987 | - |
| 4a.1.5.12 | Condensate Polishing - RCA | - | 38 | 1 | 4 | 81 | - | - | 22 | 145 | 145 | - | - | 483 | - | - | - | - | 19,616 | 493 | - |
| 4a.1.5.13 | Electro-Hydraulic | - | 10 | - | - | - | - | - | 1 | 11 | - | - | 11 | - | - | - | - | - | - | 143 | - |
| 4a.1.5.14 | External Circulating Water | - | 26 | - | - | - | - | - | 4 | 30 | - | - | 30 | - | - | - | - | - | - | 385 | - |
| 4a.1.5.15 | External Circulating Water - RCA | - | 72 | 1 | 5 | 121 | - | - | 37 | 237 | 237 | - | - | 721 | - | - | - | - | 29,284 | 938 | - |
| 4a.1.5.16 | Feedwater | - | 127 | - | - | - | - | - | 19 | 146 | - | - | 146 | - | - | - | - | - | - | 1,840 | - |
| 4a.1.5.17 | Feedwater - RCA | - | 248 | 8 | 31 | 694 | - | - | 171 | 1,152 | 1,152 | - | - | 4,147 | - | - | - | - | 168,414 | 3,377 | - |
| 4a.1.5.18 | Gland Seal | - | 34 | - | - | - | - | - | 5 | 39 | - | - | 39 | - | - | - | - | - | - | 504 | - |
| 4a.1.5.19 | Heater Drain | - | 384 | - | - | - | - | - | 58 | 441 | - | - | 441 | - | - | - | - | - | - | 5,638 | - |
| 4a.1.5.20 | Hypobromous Acid Feed | - | 6 | - | - | - | - | - | 1 | 7 | - | - | 7 | - | - | - | - | - | - | 86 | - |
| 4a.1.5.21 | Hypobromous Acid Feed - RCA | - | 1 | 0 | 0 | 0 | - | - | 0 | 2 | 2 | - | - | 2 | - | - | - | - | 100 | 12 | - |
| 4a.1.5.22 | Internal Circ Water & CDSR | - | 25 | - | - | - | - | - | 4 | 29 | - | - | 29 | - | - | - | - | - | - | 366 | - |
| 4a.1.5.23 | Main Gen/Exciter/Transformer | - | 0 | - | - | - | - | - | 0 | 0 | - | - | 0 | - | - | - | - | - | - | 5 | - |
| 4a.1.5.24 | Main Steam | - | 101 | - | - | - | - | - | 15 | 116 | - | - | 116 | - | - | - | - | - | - | 1,482 | - |
| 4a.1.5.25 | Main Steam - RCA | - | 380 | 11 | 38 | 864 | - | - | 231 | 1,525 | 1,525 | - | - | 5,166 | - | - | - | - | 209,799 | 5,146 | - |
| 4a.1.5.26 | Repairable Spare Snubbers | - | 6 | 0 | 0 | 2 | - | - | 2 | 10 | 10 | - | - | 12 | - | - | - | - | 490 | 82 | - |
| 4a.1.5.27 | Steam Exclusion | - | 2 | - | - | - | - | - | 0 | 2 | - | - | 2 | - | - | - | - | - | - | 32 | - |
| 4a.1.5.28 | Steam Exclusion - RCA | - | 4 | 0 | 0 | 4 | - | - | 2 | 10 | 10 | - | - | 24 | - | - | - | - | 966 | 47 | - |
| 4a.1.5.29 | Steam Generator Blowdown | - | 378 | 21 | 27 | 319 | 215 | - | 202 | 1,162 | 1,162 | - | - | 1,906 | 631 | - | - | - | 118,130 | 5,179 | - |
| 4a.1.5.30 | Steam Generators | - | 5 | - | - | - | - | - | 1 | 6 | - | - | 6 | - | - | - | - | - | - | 75 | - |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table I-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| Disposal of Plant Systems (continued) | | | | | | | | | | | | | | | | | | | | | |
| 4a.1.5.31 | Turbine & Moisture Separators | - | 377 | - | - | - | - | - | 57 | 434 | - | - | 434 | - | - | - | - | - | - | 5,472 | - |
| 4a.1.5.32 | Turbine Oil Purification | - | 53 | - | - | - | - | - | 8 | 61 | - | - | 61 | - | - | - | - | - | - | 757 | - |
| 4a.1.5.33 | Water Treatment | - | 453 | - | - | - | - | - | 68 | 521 | - | - | 521 | - | - | - | - | - | - | 6,677 | - |
| 4a.1.5.34 | Water Treatment - RCA | - | 20 | 0 | 1 | 19 | - | - | 8 | 49 | 49 | - | - | 115 | - | - | - | - | - | 252 | - |
| 4a.1.5 | Totals | - | 3,779 | 43 | 108 | 2,177 | 215 | - | 1,091 | 7,413 | 4,480 | - | 2,933 | 13,010 | 631 | - | - | - | - | 569,060 | 53,681 |
| 4a.1.6 | Scaffolding in support of decommissioning | - | 2,865 | 22 | 10 | 188 | 30 | - | 755 | 3,870 | 3,870 | - | - | 1,012 | 89 | - | - | - | - | 51,216 | 23,719 |
| 4a.1 | Subtotal Period 4a Activity Costs | 144 | 24,706 | 17,607 | 3,470 | 6,506 | 17,096 | 556 | 23,908 | 93,993 | 91,059 | - | 2,933 | 41,476 | 29,226 | - | 673 | - | - | 3,937,863 | 188,606 |
| Period 4a Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 4a.2.1 | Retired RPV Upper Internals Package | - | 128 | 166 | 58 | - | 1,583 | - | 944 | 2,879 | 2,879 | - | - | - | 572 | 125 | - | - | - | 49,800 | 1,667 |
| 4a.2 | Subtotal Period 4a Additional Costs | - | 128 | 166 | 58 | - | 1,583 | - | 944 | 2,879 | 2,879 | - | - | - | 572 | 125 | - | - | - | 49,800 | 1,667 |
| Period 4a Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 4a.3.1 | Process decommissioning water waste | 3 | - | 4 | 8 | - | 17 | - | 7 | 39 | 39 | - | - | - | 40 | - | - | - | - | 2,408 | 8 |
| 4a.3.3 | Small tool allowance | - | 241 | - | - | - | - | - | 36 | 277 | 249 | - | 28 | - | - | - | - | - | - | - | - |
| 4a.3.4 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 1,660 | - | 1,660 | - | 1,660 | - | - | - | - | - | - | - | - | - |
| 4a.3 | Subtotal Period 4a Collateral Costs | 3 | 241 | 4 | 8 | - | 17 | 1,660 | 43 | 1,976 | 288 | 1,660 | 28 | - | 40 | - | - | - | - | 2,408 | 8 |
| Period 4a Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 4a.4.1 | Decon supplies | 100 | - | - | - | - | - | - | 25 | 125 | 125 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.2 | Insurance | - | - | - | - | - | - | 643 | 64 | 708 | 708 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.3 | Property taxes | - | - | - | - | - | - | 4,395 | 439 | 4,834 | 2,954 | 1,881 | - | - | - | - | - | - | - | - | - |
| 4a.4.4 | Health physics supplies | - | 1,882 | - | - | - | - | - | 470 | 2,352 | 2,352 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.5 | Heavy equipment rental | - | 3,325 | - | - | - | - | - | 499 | 3,824 | 3,824 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.6 | Disposal of DAW generated | - | - | 70 | 29 | - | 293 | - | 85 | 477 | 477 | - | - | - | 3,556 | - | - | - | - | 71,113 | 116 |
| 4a.4.7 | Plant energy budget | - | - | - | - | - | - | 2,047 | 307 | 2,354 | 2,354 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.8 | NRC ISFSI Fees | - | - | - | - | - | - | 159 | 16 | 175 | - | 175 | - | - | - | - | - | - | - | - | - |
| 4a.4.9 | NRC Fees | - | - | - | - | - | - | 420 | 42 | 461 | 461 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.10 | Emergency Planning Fees | - | - | - | - | - | - | 99 | 10 | 108 | - | 108 | - | - | - | - | - | - | - | - | - |
| 4a.4.11 | Fixed Overhead | - | - | - | - | - | - | 1,581 | 237 | 1,818 | 1,818 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.12 | Liquid Radwaste Processing Equipment/Services | - | - | - | - | - | - | 565 | 85 | 649 | 649 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.13 | ISFSI Operating Costs | - | - | - | - | - | - | 74 | 11 | 86 | - | 86 | - | - | - | - | - | - | - | - | - |
| 4a.4.14 | Railroad Track Maintenance | - | - | - | - | - | - | 83 | 12 | 96 | 96 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.15 | Remedial Actions Surveys | - | - | - | - | - | - | 1,489 | 223 | 1,712 | 1,712 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.16 | Security Staff Cost | - | - | - | - | - | - | 5,911 | 887 | 6,798 | 5,159 | 1,638 | - | - | - | - | - | - | - | - | 91,140 |
| 4a.4.17 | DOC Staff Cost | - | - | - | - | - | - | 17,103 | 2,565 | 19,668 | 19,668 | - | - | - | - | - | - | - | - | - | 189,200 |
| 4a.4.18 | Utility Staff Cost | - | - | - | - | - | - | 21,408 | 3,211 | 24,619 | 23,856 | 763 | - | - | - | - | - | - | - | - | 337,712 |
| 4a.4 | Subtotal Period 4a Period-Dependent Costs | 100 | 5,207 | 70 | 29 | - | 293 | 55,975 | 9,189 | 70,863 | 66,212 | 4,651 | - | - | 3,556 | - | - | - | - | 71,113 | 116 |
| 4a.0 | TOTAL PERIOD 4a COST | 246 | 30,282 | 17,847 | 3,564 | 6,506 | 18,989 | 58,190 | 34,084 | 169,711 | 160,439 | 6,311 | 2,961 | 41,476 | 33,394 | 125 | 673 | - | - | 4,061,184 | 190,397 |
| PERIOD 4b - Site Decontamination | | | | | | | | | | | | | | | | | | | | | |
| Period 4b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| 4b.1.1 | Remove spent fuel racks | 314 | 35 | 86 | 41 | - | 703 | - | 356 | 1,535 | 1,535 | - | - | - | 2,092 | - | - | - | - | 132,919 | 576 |
| Disposal of Plant Systems | | | | | | | | | | | | | | | | | | | | | |
| 4b.1.2.1 | ADT & Misc Ventilation | - | 22 | 1 | 1 | 26 | 3 | - | 10 | 63 | 63 | - | - | 153 | 9 | - | - | - | - | 6,803 | 325 |
| 4b.1.2.2 | Aux Bldg Normal Ventilation | - | 62 | 2 | 6 | 116 | 13 | - | 37 | 237 | 237 | - | - | 692 | 39 | - | - | - | - | 30,595 | 906 |
| 4b.1.2.3 | Aux Bldg Special Ventilation | - | 12 | 0 | 1 | 12 | 2 | - | 5 | 32 | 32 | - | - | 70 | 6 | - | - | - | - | 3,234 | 176 |
| 4b.1.2.4 | Battery Rm Special Ventilation | - | 2 | - | - | - | - | - | 0 | 2 | - | - | 2 | - | - | - | - | - | - | - | 24 |
| 4b.1.2.5 | Boron Recycle | - | 3 | 0 | 0 | 0 | 3 | - | 2 | 9 | 9 | - | - | 3 | 9 | - | - | - | - | 700 | 45 |
| 4b.1.2.6 | Chemical & Volume Control | - | 858 | 62 | 57 | 394 | 677 | - | 458 | 2,507 | 2,507 | - | - | 2,356 | 1,977 | - | - | - | - | 223,753 | 11,575 |
| 4b.1.2.7 | Cold Chemical Lab Ventilation | - | 1 | - | - | - | - | - | 0 | 1 | - | - | 1 | - | - | - | - | - | - | - | 9 |
| 4b.1.2.8 | Component Cooling - RCA | - | 647 | 25 | 88 | 2,007 | - | - | 479 | 3,246 | 3,246 | - | - | 11,996 | - | - | - | - | - | 487,169 | 8,583 |
| 4b.1.2.9 | Containment Cooling | - | 35 | - | - | - | - | - | 5 | 40 | - | - | 40 | - | - | - | - | - | - | - | 502 |
| 4b.1.2.10 | Containment Cooling - RCA | - | 302 | 6 | 20 | 459 | - | - | 148 | 934 | 934 | - | - | 2,743 | - | - | - | - | - | 111,390 | 3,949 |
| 4b.1.2.11 | Containment Hydrogen Control - RCA | - | 36 | 0 | 1 | 24 | - | - | 13 | 74 | 74 | - | - | 141 | - | - | - | - | - | 5,742 | 494 |
| 4b.1.2.12 | Containment Spray - RCA | - | 194 | 3 | 11 | 243 | - | - | 87 | 538 | 538 | - | - | 1,453 | - | - | - | - | - | 59,019 | 2,617 |
| 4b.1.2.13 | Containment Ventilation | - | 211 | 23 | 49 | 790 | 243 | - | 242 | 1,558 | 1,558 | - | - | 4,721 | 722 | - | - | - | - | 237,643 | 3,016 |
| 4b.1.2.14 | Control/Relay/Cmpt Rm Vent | - | 28 | 1 | 2 | 44 | 7 | - | 16 | 98 | 98 | - | - | 260 | 20 | - | - | - | - | 11,878 | 406 |
| 4b.1.2.15 | Cooling Water | - | 159 | - | - | - | - | - | 24 | 183 | - | - | 183 | - | - | - | - | - | - | - | 2,344 |
| 4b.1.2.16 | Cooling Water - RCA | - | 476 | 17 | 62 | 1,412 | - | - | 342 | 2,310 | 2,310 | - | - | 8,442 | - | - | - | - | - | 342,822 | 6,311 |
| 4b.1.2.17 | Cranes/Hoists/Elevators - RCA | - | 3 | 0 | 1 | 17 | - | - | 4 | 25 | 25 | - | - | 103 | - | - | - | - | - | 4,184 | 48 |
| 4b.1.2.18 | D3 Emergency Diesel | - | 10 | - | - | - | - | - | 2 | 12 | - | - | 12 | - | - | - | - | - | - | - | 141 |
| 4b.1.2.19 | D4 Emergency Diesel | - | 10 | - | - | - | - | - | 2 | 12 | - | - | 12 | - | - | - | - | - | - | - | 141 |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table I-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | | |
|---------------------------------------|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|---------|---|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | | |
| Disposal of Plant Systems (continued) | | | | | | | | | | | | | | | | | | | | | | | |
| 4b.1.2.20 | D5 Emergency Diesel | - | 0 | - | - | - | - | - | 0 | 0 | - | - | 0 | - | - | - | - | - | - | - | 5 | - | |
| 4b.1.2.21 | Electrical - Clean | - | 1,714 | - | - | - | - | - | 257 | 1,972 | - | - | 1,972 | - | - | - | - | - | - | - | - | 24,276 | - |
| 4b.1.2.22 | Electrical - Contaminated | - | 430 | 5 | 16 | 334 | 25 | - | 167 | 978 | 978 | - | - | 1,997 | 75 | - | - | - | - | - | 85,887 | 5,813 | - |
| 4b.1.2.23 | Electrical - Contaminated - Fuel Pool | - | 184 | 2 | 7 | 145 | 11 | - | 72 | 421 | 421 | - | - | 864 | 33 | - | - | - | - | - | 37,167 | 2,488 | - |
| 4b.1.2.24 | Electrical - Decontaminated | - | 2,955 | 38 | 138 | 3,138 | - | - | 1,234 | 7,503 | 7,503 | - | - | 18,753 | - | - | - | - | - | - | 761,569 | 38,423 | - |
| 4b.1.2.25 | Electrical - Decontaminated - Fuel Pool | - | 1,269 | 17 | 59 | 1,350 | - | - | 530 | 3,225 | 3,225 | - | - | 8,069 | - | - | - | - | - | - | 327,668 | 16,495 | - |
| 4b.1.2.26 | Filter Rm Ventilation | - | 4 | 0 | 0 | 4 | 0 | - | 2 | 10 | 10 | - | - | 24 | 1 | - | - | - | - | - | 1,017 | 61 | - |
| 4b.1.2.27 | Fire Protection & Detection | - | 204 | - | - | - | - | - | 31 | 235 | - | - | 235 | - | - | - | - | - | - | - | - | 3,009 | - |
| 4b.1.2.28 | Fire Protection & Detection - RCA | - | 246 | 4 | 13 | 306 | - | - | 110 | 679 | 679 | - | - | 1,828 | - | - | - | - | - | - | 74,245 | 3,134 | - |
| 4b.1.2.29 | Fire Protection & Detection - RCA Fuel P | - | 37 | 1 | 2 | 48 | - | - | 17 | 105 | 105 | - | - | 286 | - | - | - | - | - | - | 11,622 | 476 | - |
| 4b.1.2.30 | Fuel Handling | - | 66 | 1 | 2 | 34 | 17 | - | 26 | 146 | 146 | - | - | 200 | 49 | - | - | - | - | - | 11,273 | 983 | - |
| 4b.1.2.31 | Fuel Oil | - | 1 | - | - | - | - | - | 0 | 1 | - | - | 1 | - | - | - | - | - | - | - | - | 9 | - |
| 4b.1.2.32 | HVAC - Clean | - | 151 | - | - | - | - | - | 23 | 174 | - | - | 174 | - | - | - | - | - | - | - | - | 2,373 | - |
| 4b.1.2.33 | HVAC - Contaminated | - | 1,112 | 29 | 87 | 1,798 | 136 | - | 598 | 3,759 | 3,759 | - | - | 10,745 | 405 | - | - | - | - | - | 462,103 | 14,282 | - |
| 4b.1.2.34 | HVAC - Contaminated - Fuel Pool | - | 499 | 13 | 39 | 808 | 61 | - | 268 | 1,689 | 1,689 | - | - | 4,828 | 182 | - | - | - | - | - | 207,612 | 6,417 | - |
| 4b.1.2.35 | Heating | - | 322 | - | - | - | - | - | 48 | 370 | - | - | 370 | - | - | - | - | - | - | - | - | 4,804 | - |
| 4b.1.2.36 | Heating - RCA | - | 337 | 4 | 14 | 319 | - | - | 135 | 809 | 809 | - | - | 1,907 | - | - | - | - | - | - | 77,458 | 4,086 | - |
| 4b.1.2.37 | Hot Lab & Sample Rm Ventilation | - | 17 | 0 | 1 | 18 | 1 | - | 8 | 46 | 46 | - | - | 107 | 4 | - | - | - | - | - | 4,622 | 255 | - |
| 4b.1.2.38 | Incore Instrumentation | - | 27 | 1 | 2 | 10 | 20 | - | 13 | 73 | 73 | - | - | 60 | 58 | - | - | - | - | - | 6,143 | 412 | - |
| 4b.1.2.39 | Misc Drains & Vents | - | 213 | 12 | 12 | 77 | 145 | - | 104 | 563 | 563 | - | - | 458 | 426 | - | - | - | - | - | 46,079 | 2,841 | - |
| 4b.1.2.40 | Misc Lab & Service Areas Vent | - | 118 | 8 | 8 | 62 | 84 | - | 62 | 342 | 342 | - | - | 370 | 244 | - | - | - | - | - | 30,899 | 1,537 | - |
| 4b.1.2.41 | Miscellaneous Gas | - | 72 | - | - | - | - | - | 11 | 83 | - | - | 83 | - | - | - | - | - | - | - | - | 1,073 | - |
| 4b.1.2.42 | Miscellaneous Gas - RCA | - | 134 | 1 | 4 | 100 | - | - | 49 | 289 | 289 | - | - | 600 | - | - | - | - | - | - | 24,378 | 1,636 | - |
| 4b.1.2.43 | Radiation Monitoring | - | 7 | - | - | - | - | - | 1 | 9 | - | - | 9 | - | - | - | - | - | - | - | - | 111 | - |
| 4b.1.2.44 | Radiation Monitoring - RCA | - | 65 | 1 | 2 | 53 | - | - | 25 | 145 | 145 | - | - | 316 | - | - | - | - | - | - | 12,826 | 782 | - |
| 4b.1.2.45 | Reactor Coolant | - | 216 | 20 | 16 | 38 | 249 | - | 126 | 666 | 666 | - | - | 229 | 730 | - | - | - | - | - | 56,440 | 2,891 | - |
| 4b.1.2.46 | Reactor Hot Sampling | - | 116 | 11 | 7 | 9 | 108 | - | 60 | 311 | 311 | - | - | 54 | 312 | - | - | - | - | - | 22,678 | 1,499 | - |
| 4b.1.2.47 | Reactor Makeup | - | 41 | - | - | - | - | - | 6 | 47 | - | - | 47 | - | - | - | - | - | - | - | - | 583 | - |
| 4b.1.2.48 | Reactor Makeup - RCA | - | 4 | 0 | 0 | 5 | - | - | 2 | 11 | 11 | - | - | 28 | - | - | - | - | - | - | 1,148 | 47 | - |
| 4b.1.2.49 | Reactor Vessel | - | 16 | 1 | 0 | 4 | 5 | - | 6 | 32 | 32 | - | - | 22 | 14 | - | - | - | - | - | 1,816 | 225 | - |
| 4b.1.2.50 | Residual Heat Removal | - | 354 | 84 | 86 | 477 | 1,102 | - | 457 | 2,562 | 2,562 | - | - | 2,853 | 3,244 | - | - | - | - | - | 324,232 | 5,039 | - |
| 4b.1.2.51 | Safeguards Chilled Water | - | 5 | - | - | - | - | - | 1 | 6 | - | - | 6 | - | - | - | - | - | - | - | - | 75 | - |
| 4b.1.2.52 | Safeguards Chilled Water - RCA | - | 5 | 0 | 0 | 4 | - | - | 2 | 11 | 11 | - | - | 26 | - | - | - | - | - | - | 1,045 | 51 | - |
| 4b.1.2.53 | Safety Injection | - | 793 | 42 | 72 | 1,117 | 395 | - | 479 | 2,898 | 2,898 | - | - | 6,676 | 1,161 | - | - | - | - | - | 345,708 | 11,029 | - |
| 4b.1.2.54 | Sampling | - | 48 | 3 | 2 | 6 | 32 | - | 22 | 113 | 113 | - | - | 37 | 93 | - | - | - | - | - | 7,628 | 645 | - |
| 4b.1.2.55 | Service Bldg & New Cmpt Vent | - | 0 | - | - | - | - | - | 0 | 0 | - | - | 0 | - | - | - | - | - | - | - | - | 6 | - |
| 4b.1.2.56 | Shield Bldg Ventilation | - | 108 | 13 | 25 | 339 | 163 | - | 124 | 771 | 771 | - | - | 2,028 | 484 | - | - | - | - | - | 113,139 | 1,555 | - |
| 4b.1.2.57 | Spent Fuel Pool Cooling | - | 33 | 3 | 2 | 6 | 37 | - | 19 | 101 | 101 | - | - | 39 | 107 | - | - | - | - | - | 8,481 | 427 | - |
| 4b.1.2.58 | Spent Fuel Pool Normal Ventilation | - | 24 | 1 | 2 | 44 | 4 | - | 14 | 90 | 90 | - | - | 265 | 12 | - | - | - | - | - | 11,505 | 352 | - |
| 4b.1.2.59 | Station & Instrument Air | - | 161 | - | - | - | - | - | 24 | 185 | - | - | 185 | - | - | - | - | - | - | - | - | 2,424 | - |
| 4b.1.2.60 | Station & Instrument Air - RCA | - | 299 | 3 | 12 | 272 | - | - | 118 | 704 | 704 | - | - | 1,625 | - | - | - | - | - | - | 65,986 | 3,638 | - |
| 4b.1.2.61 | Turbine Bldg Traps & Drains | - | 30 | - | - | - | - | - | 5 | 35 | - | - | 35 | - | - | - | - | - | - | - | - | 462 | - |
| 4b.1.2.62 | Turbine Bldg Traps & Drains - RCA | - | 30 | 0 | 1 | 30 | - | - | 12 | 73 | 73 | - | - | 180 | - | - | - | - | - | - | 7,321 | 344 | - |
| 4b.1.2.63 | Turbine Bldg Ventilation | - | 46 | - | - | - | - | - | 7 | 53 | - | - | 53 | - | - | - | - | - | - | - | - | 655 | - |
| 4b.1.2.64 | Unit Coolers | - | 23 | - | - | - | - | - | 3 | 26 | - | - | 26 | - | - | - | - | - | - | - | - | 332 | - |
| 4b.1.2.65 | Unit Coolers - RCA | - | 56 | 0 | 2 | 39 | - | - | 20 | 117 | 117 | - | - | 232 | - | - | - | - | - | - | 9,413 | 690 | - |
| 4b.1.2.66 | Waste Gas Disposal | - | 438 | 43 | 45 | 410 | 464 | - | 298 | 1,699 | 1,699 | - | - | 2,453 | 1,358 | - | - | - | - | - | 187,339 | 5,879 | - |
| 4b.1.2.67 | Waste Liquid Disposal | - | 1,642 | 116 | 100 | 612 | 1,234 | - | 837 | 4,541 | 4,541 | - | - | 3,655 | 3,594 | - | - | - | - | - | 381,754 | 22,011 | - |
| 4b.1.2.68 | Waste Solid Disposal | - | 132 | 12 | 11 | 65 | 134 | - | 79 | 433 | 433 | - | - | 389 | 393 | - | - | - | - | - | 41,177 | 1,781 | - |
| 4b.1.2 | Totals | - | 17,877 | 633 | 1,092 | 17,625 | 5,377 | - | 8,385 | 50,989 | 47,545 | - | 3,444 | 105,339 | 15,761 | - | - | - | - | - | 5,294,310 | 240,033 | - |
| 4b.1.3 | Scaffolding in support of decommissioning | - | 4,297 | 33 | 15 | 281 | 45 | - | 1,133 | 5,804 | 5,804 | - | - | 1,518 | 134 | - | - | - | - | - | 76,824 | 35,578 | - |
| Decontamination of Site Buildings | | | | | | | | | | | | | | | | | | | | | | | |
| 4b.1.4.1 | Reactor | 1,096 | 2,528 | 240 | 1,236 | 373 | 7,080 | - | 3,215 | 15,768 | 15,768 | - | - | 2,230 | 67,331 | - | - | - | - | - | 3,286,725 | 45,740 | - |
| 4b.1.4.2 | Auxiliary | 1,168 | 375 | 23 | 117 | 177 | 648 | - | 886 | 3,395 | 3,395 | - | - | 1,060 | 6,118 | - | - | - | - | - | 332,495 | 21,235 | - |
| 4b.1.4.3 | Backwash Waste Receiving Tank | - | 25 | 3 | 17 | - | 97 | - | 33 | 175 | 175 | - | - | - | 929 | - | - | - | - | - | 43,896 | 266 | - |
| 4b.1.4.4 | Drum Transfer & Truck Loading Enclosure | 16 | 8 | 1 | 3 | 3 | 14 | - | 15 | 59 | 59 | - | - | 19 | 135 | - | - | - | - | - | 7,118 | 328 | - |
| 4b.1.4.5 | LLRW Storage Enclosure | 111 | 48 | 3 | 17 | 6 | 96 | - | 95 | 377 | 377 | - | - | 38 | 920 | - | - | - | - | - | 44,971 | 2,151 | - |
| 4b.1.4.6 | Radwaste | 50 | 21 | 1 | 8 | 7 | 43 | - | 43 | 174 | 174 | - | - | 42 | 412 | - | - | - | - | - | 21,136 | 964 | - |
| 4b.1.4.7 | Resin Disposal | 15 | 11 | 1 | 3 | 14 | 14 | - | 16 | 72 | 72 | - | - | 83 | 124 | - | - | - | - | - | 9,271 | 340 | - |
| 4b.1.4.8 | Fuel Handling of Aux Building | 924 | 1,015 | 13 | 45 | 404 | 195 | - | 833 | 3,430 | 3,430 | - | - | 2,417 | 1,652 | - | - | - | - | - | 177,755 | 27,145 | - |
| 4b.1.4 | Totals | 3,380 | 4,031 | 285 | 1,445 | | | | | | | | | | | | | | | | | | |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table I-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| 4b.1 | Subtotal Period 4b Activity Costs | 3,693 | 26,240 | 1,036 | 2,594 | 18,892 | 14,312 | 225 | 15,045 | 82,037 | 78,593 | - | 3,444 | 112,746 | 95,607 | - | - | - | 9,427,420 | 374,358 | 1,751 |
| Period 4b Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 4b.2.1 | License Termination Survey Planning | - | - | - | - | - | - | 1,037 | 311 | 1,348 | 1,348 | - | - | - | - | - | - | - | - | - | 6,240 |
| 4b.2.2 | Excavation of Underground Services | - | 1,175 | - | - | - | - | 225 | 328 | 1,728 | 1,728 | - | - | - | - | - | - | - | - | 7,411 | - |
| 4b.2.3 | Operational Equipment | - | - | 11 | 36 | 606 | - | - | 97 | 751 | 751 | - | - | 5,880 | - | - | - | - | 147,000 | 16 | - |
| 4b.2 | Subtotal Period 4b Additional Costs | - | 1,175 | 11 | 36 | 606 | - | 1,262 | 736 | 3,827 | 3,827 | - | - | 5,880 | - | - | - | - | 147,000 | 7,427 | 6,240 |
| Period 4b Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 4b.3.1 | Process decommissioning water waste | 7 | - | 12 | 21 | - | 48 | - | 20 | 107 | 107 | - | - | - | 109 | - | - | - | 6,547 | 21 | - |
| 4b.3.3 | Small tool allowance | - | 443 | - | - | - | - | - | 66 | 509 | 509 | - | - | - | - | - | - | - | - | - | - |
| 4b.3.4 | Decommissioning Equipment Disposition | - | - | 130 | 67 | 1,112 | 178 | - | 234 | 1,722 | 1,722 | - | - | 6,000 | 529 | - | - | - | 303,608 | 147 | - |
| 4b.3.5 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 2,225 | - | 2,225 | - | 2,225 | - | - | - | - | - | - | - | - | - |
| 4b.3 | Subtotal Period 4b Collateral Costs | 7 | 443 | 142 | 88 | 1,112 | 225 | 2,225 | 320 | 4,563 | 2,338 | 2,225 | - | 6,000 | 638 | - | - | - | 310,155 | 168 | - |
| Period 4b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 4b.4.1 | Decon supplies | 1,449 | - | - | - | - | - | - | 362 | 1,811 | 1,811 | - | - | - | - | - | - | - | - | - | - |
| 4b.4.2 | Insurance | - | - | - | - | - | - | 862 | 86 | 949 | 949 | - | - | - | - | - | - | - | - | - | - |
| 4b.4.3 | Property taxes | - | - | - | - | - | - | 5,715 | 572 | 6,287 | 3,785 | 2,502 | - | - | - | - | - | - | - | - | - |
| 4b.4.4 | Health physics supplies | - | 3,213 | - | - | - | - | - | 803 | 4,016 | 4,016 | - | - | - | - | - | - | - | - | - | - |
| 4b.4.5 | Heavy equipment rental | - | 4,577 | - | - | - | - | - | 687 | 5,263 | 5,263 | - | - | - | - | - | - | - | - | - | - |
| 4b.4.6 | Disposal of DAW generated | - | - | 116 | 47 | - | 482 | - | 139 | 784 | 784 | - | - | - | 5,851 | - | - | - | 117,027 | 191 | - |
| 4b.4.7 | Plant energy budget | - | - | - | - | - | - | 2,165 | 325 | 2,490 | 2,490 | - | - | - | - | - | - | - | - | - | - |
| 4b.4.8 | NRC ISFSI Fees | - | - | - | - | - | - | 213 | 21 | 234 | - | 234 | - | - | - | - | - | - | - | - | - |
| 4b.4.9 | NRC Fees | - | - | - | - | - | - | 562 | 56 | 618 | 618 | - | - | - | - | - | - | - | - | - | - |
| 4b.4.10 | Emergency Planning Fees | - | - | - | - | - | - | 132 | 13 | 145 | - | 145 | - | - | - | - | - | - | - | - | - |
| 4b.4.11 | Fixed Overhead | - | - | - | - | - | - | 2,118 | 318 | 2,436 | 2,436 | - | - | - | - | - | - | - | - | - | - |
| 4b.4.12 | Liquid Radwaste Processing Equipment/Services | - | - | - | - | - | - | 757 | 113 | 870 | 870 | - | - | - | - | - | - | - | - | - | - |
| 4b.4.13 | ISFSI Operating Costs | - | - | - | - | - | - | 100 | 15 | 115 | - | 115 | - | - | - | - | - | - | - | - | - |
| 4b.4.14 | Railroad Track Maintenance | - | - | - | - | - | - | 111 | 17 | 128 | 128 | - | - | - | - | - | - | - | - | - | - |
| 4b.4.15 | Remedial Actions Surveys | - | - | - | - | - | - | 1,995 | 299 | 2,294 | 2,294 | - | - | - | - | - | - | - | - | - | - |
| 4b.4.16 | Security Staff Cost | - | - | - | - | - | - | 10,435 | 1,565 | 12,000 | 8,988 | 3,012 | - | - | - | - | - | - | - | - | 160,203 |
| 4b.4.17 | DOC Staff Cost | - | - | - | - | - | - | 22,641 | 3,396 | 26,038 | 26,038 | - | - | - | - | - | - | - | - | - | 248,175 |
| 4b.4.18 | Utility Staff Cost | - | - | - | - | - | - | 28,347 | 4,252 | 32,600 | 31,361 | 1,239 | - | - | - | - | - | - | - | - | 440,789 |
| 4b.4 | Subtotal Period 4b Period-Dependent Costs | 1,449 | 7,790 | 116 | 47 | - | 482 | 76,155 | 13,040 | 99,079 | 91,832 | 7,247 | - | - | 5,851 | - | - | - | 117,027 | 191 | 849,167 |
| 4b.0 | TOTAL PERIOD 4b COST | 5,149 | 35,647 | 1,305 | 2,766 | 20,610 | 15,020 | 79,868 | 29,142 | 189,506 | 176,590 | 9,472 | 3,444 | 124,626 | 102,096 | - | - | - | 10,001,600 | 382,144 | 857,159 |
| PERIOD 4f - License Termination | | | | | | | | | | | | | | | | | | | | | |
| Period 4f Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| 4f.1.1 | ORISE confirmatory survey | - | - | - | - | - | - | 166 | 50 | 216 | 216 | - | - | - | - | - | - | - | - | - | - |
| 4f.1.2 | Terminate license | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 4f.1 | Subtotal Period 4f Activity Costs | - | - | - | - | - | - | 166 | 50 | 216 | 216 | - | - | - | - | - | - | - | - | - | - |
| Period 4f Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 4f.2.1 | License Termination Survey | - | - | - | - | - | - | 7,041 | 2,112 | 9,154 | 9,154 | - | - | - | - | - | - | - | - | 100,895 | 3,120 |
| 4f.2 | Subtotal Period 4f Additional Costs | - | - | - | - | - | - | 7,041 | 2,112 | 9,154 | 9,154 | - | - | - | - | - | - | - | - | 100,895 | 3,120 |
| Period 4f Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 4f.3.1 | DOC staff relocation expenses | - | - | - | - | - | - | 1,264 | 190 | 1,454 | 1,454 | - | - | - | - | - | - | - | - | - | - |
| 4f.3.2 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 218 | 33 | 250 | - | 250 | - | - | - | - | - | - | - | - | - |
| 4f.3.3 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 934 | - | 934 | - | 934 | - | - | - | - | - | - | - | - | - |
| 4f.3 | Subtotal Period 4f Collateral Costs | - | - | - | - | - | - | 2,416 | 222 | 2,638 | 1,454 | 1,185 | - | - | - | - | - | - | - | - | - |
| Period 4f Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 4f.4.1 | Insurance | - | - | - | - | - | - | 362 | 36 | 398 | - | 398 | - | - | - | - | - | - | - | - | - |
| 4f.4.2 | Property taxes | - | - | - | - | - | - | 2,306 | 231 | 2,537 | 1,469 | 1,068 | - | - | - | - | - | - | - | - | - |
| 4f.4.3 | Health physics supplies | - | 710 | - | - | - | - | - | 178 | 888 | 888 | - | - | - | - | - | - | - | - | - | - |
| 4f.4.4 | Disposal of DAW generated | - | - | 7 | 3 | - | 28 | - | 8 | 45 | 45 | - | - | 334 | - | - | - | - | 6,685 | 11 | - |
| 4f.4.5 | Plant energy budget | - | - | - | - | - | - | 243 | 36 | 279 | 279 | - | - | - | - | - | - | - | - | - | - |
| 4f.4.6 | NRC ISFSI Fees | - | - | - | - | - | - | 90 | 9 | 98 | - | 98 | - | - | - | - | - | - | - | - | - |
| 4f.4.7 | NRC Fees | - | - | - | - | - | - | 263 | 26 | 290 | 290 | - | - | - | - | - | - | - | - | - | - |
| 4f.4.8 | Emergency Planning Fees | - | - | - | - | - | - | 55 | 6 | 61 | - | 61 | - | - | - | - | - | - | - | - | - |
| 4f.4.9 | Fixed Overhead | - | - | - | - | - | - | 890 | 133 | 1,023 | 1,023 | - | - | - | - | - | - | - | - | - | - |
| 4f.4.10 | ISFSI Operating Costs | - | - | - | - | - | - | 42 | 6 | 48 | - | 48 | - | - | - | - | - | - | - | - | - |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table I-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|--|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| Period 4f Period-Dependent Costs (continued) | | | | | | | | | | | | | | | | | | | | | |
| 4f.4.11 | Railroad Track Maintenance | - | - | - | - | - | - | 47 | 7 | 54 | 54 | - | - | - | - | - | - | - | - | - | - |
| 4f.4.12 | Security Staff Cost | - | - | - | - | - | - | 1,835 | 275 | 2,111 | 927 | 1,184 | - | - | - | - | - | - | - | - | 27,614 |
| 4f.4.13 | DOC Staff Cost | - | - | - | - | - | - | 4,238 | 636 | 4,874 | 4,874 | - | - | - | - | - | - | - | - | - | 46,283 |
| 4f.4.14 | Utility Staff Cost | - | - | - | - | - | - | 4,011 | 602 | 4,613 | 4,175 | 438 | - | - | - | - | - | - | - | - | 59,507 |
| 4f.4 | Subtotal Period 4f Period-Dependent Costs | - | 710 | 7 | 3 | - | 28 | 14,382 | 2,189 | 17,319 | 14,022 | 3,296 | - | - | 334 | - | - | - | 6,685 | 11 | 133,404 |
| 4f.0 | TOTAL PERIOD 4f COST | - | 710 | 7 | 3 | - | 28 | 24,006 | 4,574 | 29,327 | 24,846 | 4,481 | - | - | 334 | - | - | - | 6,685 | 100,906 | 136,524 |
| PERIOD 4 TOTALS | | 5,395 | 66,639 | 19,159 | 6,333 | 27,115 | 34,036 | 162,064 | 67,800 | 388,543 | 361,874 | 20,263 | 6,405 | 166,102 | 135,824 | 125 | 673 | - | 14,069,470 | 673,447 | 1,616,988 |
| PERIOD 5b - Site Restoration | | | | | | | | | | | | | | | | | | | | | |
| Period 5b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| Demolition of Remaining Site Buildings | | | | | | | | | | | | | | | | | | | | | |
| 5b.1.1.1 | Reactor | - | 4,645 | - | - | - | - | - | 697 | 5,342 | - | - | 5,342 | - | - | - | - | - | - | 44,679 | - |
| 5b.1.1.2 | Auxiliary | - | 1,993 | - | - | - | - | - | 299 | 2,291 | - | - | 2,291 | - | - | - | - | - | - | 11,902 | - |
| 5b.1.1.3 | Condensate Storage Tank Foundation | - | 7 | - | - | - | - | - | 1 | 8 | - | - | 8 | - | - | - | - | - | - | 33 | - |
| 5b.1.1.4 | Construction Warehouse & Fab Shop | - | 130 | - | - | - | - | - | 19 | 149 | - | - | 149 | - | - | - | - | - | - | 1,405 | - |
| 5b.1.1.5 | D3/D4 Emergency Generator | - | 14 | - | - | - | - | - | 2 | 16 | - | - | 16 | - | - | - | - | - | - | 84 | - |
| 5b.1.1.6 | Drum Transfer & Truck Loading Enclosure | - | 20 | - | - | - | - | - | 3 | 24 | - | - | 24 | - | - | - | - | - | - | 221 | - |
| 5b.1.1.7 | Hydrogen House | - | 6 | - | - | - | - | - | 1 | 7 | - | - | 7 | - | - | - | - | - | - | 47 | - |
| 5b.1.1.8 | LLRW Storage Enclosure | - | 128 | - | - | - | - | - | 19 | 147 | - | - | 147 | - | - | - | - | - | - | 853 | - |
| 5b.1.1.9 | Misc Structures 2017 | - | 2,617 | - | - | - | - | - | 393 | 3,009 | - | - | 3,009 | - | - | - | - | - | - | 22,582 | - |
| 5b.1.1.10 | Radwaste | - | 176 | - | - | - | - | - | 26 | 202 | - | - | 202 | - | - | - | - | - | - | 1,400 | - |
| 5b.1.1.11 | Resin Disposal | - | 14 | - | - | - | - | - | 2 | 16 | - | - | 16 | - | - | - | - | - | - | 120 | - |
| 5b.1.1.12 | Structures below 3' below grade | - | 1,785 | - | - | - | - | - | 268 | 2,052 | - | - | 2,052 | - | - | - | - | - | - | 9,238 | - |
| 5b.1.1.13 | Sulfuric Acid Tank Enclosure | - | 3 | - | - | - | - | - | 0 | 4 | - | - | 4 | - | - | - | - | - | - | 35 | - |
| 5b.1.1.14 | Turbine | - | 2,140 | - | - | - | - | - | 321 | 2,461 | - | - | 2,461 | - | - | - | - | - | - | 21,997 | - |
| 5b.1.1.15 | Turbine Pedestal | - | 365 | - | - | - | - | - | 55 | 420 | - | - | 420 | - | - | - | - | - | - | 1,857 | - |
| 5b.1.1.16 | Warehouse #2 | - | 24 | - | - | - | - | - | 4 | 27 | - | - | 27 | - | - | - | - | - | - | 213 | - |
| 5b.1.1.17 | Waste Neutralizing Tank House | - | 7 | - | - | - | - | - | 1 | 8 | - | - | 8 | - | - | - | - | - | - | 56 | - |
| 5b.1.1.18 | Waste Oil Storage | - | 9 | - | - | - | - | - | 1 | 10 | - | - | 10 | - | - | - | - | - | - | 70 | - |
| 5b.1.1.19 | Water Treatment | - | 324 | - | - | - | - | - | 49 | 373 | - | - | 373 | - | - | - | - | - | - | 2,690 | - |
| 5b.1.1.20 | Fuel Handling of Aux Building | - | 1,095 | - | - | - | - | - | 164 | 1,259 | - | - | 1,259 | - | - | - | - | - | - | 8,240 | - |
| 5b.1.1 | Totals | - | 15,501 | - | - | - | - | - | 2,325 | 17,826 | - | - | 17,826 | - | - | - | - | - | - | 127,723 | - |
| Site Closeout Activities | | | | | | | | | | | | | | | | | | | | | |
| 5b.1.2 | Remove Rubble | - | 1,517 | - | - | - | - | - | 228 | 1,745 | - | - | 1,745 | - | - | - | - | - | - | 7,408 | - |
| 5b.1.3 | Grade & landscape site | - | 448 | - | - | - | - | - | 67 | 515 | - | - | 515 | - | - | - | - | - | - | 921 | - |
| 5b.1.4 | Final report to NRC | - | - | - | - | - | - | 86 | 13 | 99 | 99 | - | - | - | - | - | - | - | - | - | 667 |
| 5b.1 | Subtotal Period 5b Activity Costs | - | 17,466 | - | - | - | - | 86 | 2,633 | 20,185 | 99 | - | 20,086 | - | - | - | - | - | - | 136,051 | 667 |
| Period 5b Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 5b.2.1 | Clean Concrete Disposal | - | 4,912 | - | - | - | - | 10 | 738 | 5,660 | - | - | 5,660 | - | - | - | - | - | - | 18,372 | - |
| 5b.2.2 | Intake Structure Cofferdam | - | 442 | - | - | - | - | - | 66 | 508 | - | - | 508 | - | - | - | - | - | - | 3,552 | - |
| 5b.2.3 | Construction Debris | - | - | - | - | - | - | 2,150 | 323 | 2,473 | - | - | 2,473 | - | - | - | - | - | - | - | - |
| 5b.2.4 | Backfill | - | 9,257 | - | - | - | - | - | 1,388 | 10,645 | - | - | 10,645 | - | - | - | - | - | - | 9,327 | - |
| 5b.2.5 | Disposition of Original Casks | - | 24 | 80 | 418 | - | 2,390 | - | 728 | 3,640 | 3,640 | - | - | - | 8,929 | - | - | - | 1,059,612 | 146 | - |
| 5b.2 | Subtotal Period 5b Additional Costs | - | 14,634 | 80 | 418 | - | 2,390 | 2,160 | 3,244 | 22,926 | 3,640 | - | 19,286 | - | 8,929 | - | - | - | 1,059,612 | 31,397 | - |
| Period 5b Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 5b.3.1 | Small tool allowance | - | 213 | - | - | - | - | - | 32 | 245 | - | - | 245 | - | - | - | - | - | - | - | - |
| 5b.3.2 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 5,519 | 828 | 6,347 | - | 6,347 | - | - | - | - | - | - | - | - | - |
| 5b.3.3 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 2,649 | - | 2,649 | - | 2,649 | - | - | - | - | - | - | - | - | - |
| 5b.3 | Subtotal Period 5b Collateral Costs | - | 213 | - | - | - | - | 8,168 | 860 | 9,241 | - | 8,996 | 245 | - | - | - | - | - | - | - | - |
| Period 5b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 5b.4.1 | Insurance | - | - | - | - | - | - | 513 | 51 | 565 | - | 565 | - | - | - | - | - | - | - | - | - |
| 5b.4.2 | Property taxes | - | - | - | - | - | - | 5,904 | 590 | 6,494 | - | 2,663 | 3,831 | - | - | - | - | - | - | - | - |
| 5b.4.3 | Heavy equipment rental | - | 7,144 | - | - | - | - | - | 1,072 | 8,215 | - | - | 8,215 | - | - | - | - | - | - | - | - |
| 5b.4.4 | Plant energy budget | - | - | - | - | - | - | 344 | 52 | 395 | - | 395 | - | - | - | - | - | - | - | - | - |
| 5b.4.5 | NRC ISFSI Fees | - | - | - | - | - | - | 326 | 33 | 359 | - | 359 | - | - | - | - | - | - | - | - | - |
| 5b.4.6 | Emergency Planning Fees | - | - | - | - | - | - | 157 | 16 | 173 | - | 173 | - | - | - | - | - | - | - | - | - |
| 5b.4.7 | Fixed Overhead | - | - | - | - | - | - | 1,024 | 154 | 1,178 | - | 781 | 397 | - | - | - | - | - | - | - | - |
| 5b.4.8 | ISFSI Operating Costs | - | - | - | - | - | - | 119 | 18 | 136 | - | 136 | - | - | - | - | - | - | - | - | - |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table I-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| Period 5b Period-Dependent Costs (continued) | | | | | | | | | | | | | | | | | | | | | |
| 5b.4.9 | Railroad Track Maintenance | - | - | - | - | - | - | 133 | 20 | 152 | (0) | 97 | 56 | - | - | - | - | - | - | - | - |
| 5b.4.10 | Security Staff Cost | - | - | - | - | - | - | 4,976 | 746 | 5,722 | 0 | 5,310 | 412 | - | - | - | - | - | - | - | 74,431 |
| 5b.4.11 | DOC Staff Cost | - | - | - | - | - | - | 10,921 | 1,638 | 12,559 | - | - | 12,559 | - | - | - | - | - | - | - | 116,885 |
| 5b.4.12 | Utility Staff Cost | - | - | - | - | - | - | 5,170 | 776 | 5,946 | - | 1,278 | 4,668 | - | - | - | - | - | - | - | 76,637 |
| 5b.4 | Subtotal Period 5b Period-Dependent Costs | - | 7,144 | - | - | - | - | 29,587 | 5,165 | 41,895 | 0 | 11,757 | 30,139 | - | - | - | - | - | - | - | 267,952 |
| 5b.0 | TOTAL PERIOD 5b COST | - | 39,457 | 80 | 418 | - | 2,390 | 40,001 | 11,901 | 94,247 | 3,739 | 20,753 | 69,756 | - | 8,929 | - | - | - | 1,059,612 | 167,448 | 268,620 |
| PERIOD 5c - Fuel Storage Operations/Shipping | | | | | | | | | | | | | | | | | | | | | |
| Period 5c Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| Period 5c Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 5c.3.1 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 89,253 | 13,388 | 102,641 | - | 102,641 | - | - | - | - | - | - | - | - | - |
| 5c.3.2 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 27,796 | - | 27,796 | - | 27,796 | - | - | - | - | - | - | - | - | - |
| 5c.3 | Subtotal Period 5c Collateral Costs | - | - | - | - | - | - | 117,049 | 13,388 | 130,437 | - | 130,437 | - | - | - | - | - | - | - | - | - |
| Period 5c Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 5c.4.1 | Insurance | - | - | - | - | - | - | 5,388 | 539 | 5,927 | - | 5,927 | - | - | - | - | - | - | - | - | - |
| 5c.4.2 | Property taxes | - | - | - | - | - | - | 31,074 | 3,107 | 34,181 | - | 34,181 | - | - | - | - | - | - | - | - | - |
| 5c.4.4 | NRC ISFSI Fees | - | - | - | - | - | - | 3,422 | 342 | 3,764 | - | 3,764 | - | - | - | - | - | - | - | - | - |
| 5c.4.5 | Emergency Planning Fees | - | - | - | - | - | - | 1,650 | 165 | 1,815 | - | 1,815 | - | - | - | - | - | - | - | - | - |
| 5c.4.6 | Fixed Overhead | - | - | - | - | - | - | 3,626 | 544 | 4,170 | - | 4,170 | - | - | - | - | - | - | - | - | - |
| 5c.4.7 | ISFSI Operating Costs | - | - | - | - | - | - | 1,245 | 187 | 1,432 | - | 1,432 | - | - | - | - | - | - | - | - | - |
| 5c.4.8 | Railroad Track Maintenance | - | - | - | - | - | - | 1,391 | 209 | 1,600 | - | 1,600 | - | - | - | - | - | - | - | - | - |
| 5c.4.9 | Security Staff Cost | - | - | - | - | - | - | 42,996 | 6,449 | 49,446 | - | 49,446 | - | - | - | - | - | - | - | - | 624,838 |
| 5c.4.10 | DOC Staff Cost | - | - | - | - | - | - | 3,411 | 512 | 3,922 | - | 3,922 | - | - | - | - | - | - | - | - | 23,142 |
| 5c.4.11 | Utility Staff Cost | - | - | - | - | - | - | 21,001 | 3,150 | 24,151 | - | 24,151 | - | - | - | - | - | - | - | - | 306,633 |
| 5c.4 | Subtotal Period 5c Period-Dependent Costs | - | - | - | - | - | - | 115,204 | 15,204 | 130,408 | - | 130,408 | - | - | - | - | - | - | - | - | 954,613 |
| 5c.0 | TOTAL PERIOD 5c COST | - | - | - | - | - | - | 232,252 | 28,592 | 260,844 | - | 260,844 | - | - | - | - | - | - | - | - | 954,613 |
| PERIOD 5d - GTCC shipping | | | | | | | | | | | | | | | | | | | | | |
| Period 5d Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| Nuclear Steam Supply System Removal | | | | | | | | | | | | | | | | | | | | | |
| 5d.1.1.1 | Vessel & Internals GTCC Disposal | - | - | 1,444 | - | - | 8,680 | - | 1,663 | 11,787 | 11,787 | - | - | - | - | - | - | 1,773 | 344,823 | - | - |
| 5d.1.1 | Totals | - | - | 1,444 | - | - | 8,680 | - | 1,663 | 11,787 | 11,787 | - | - | - | - | - | - | 1,773 | 344,823 | - | - |
| 5d.1 | Subtotal Period 5d Activity Costs | - | - | 1,444 | - | - | 8,680 | - | 1,663 | 11,787 | 11,787 | - | - | - | - | - | - | 1,773 | 344,823 | - | - |
| Period 5d Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 5d.3.1 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 28 | 4 | 32 | - | 32 | - | - | - | - | - | - | - | - | - |
| 5d.3.2 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 48 | - | 48 | - | 48 | - | - | - | - | - | - | - | - | - |
| 5d.3 | Subtotal Period 5d Collateral Costs | - | - | - | - | - | - | 76 | 4 | 80 | - | 80 | - | - | - | - | - | - | - | - | - |
| Period 5d Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 5d.4.1 | Insurance | - | - | - | - | - | - | 9 | 1 | 10 | 10 | - | - | - | - | - | - | - | - | - | - |
| 5d.4.2 | Property taxes | - | - | - | - | - | - | 53 | 5 | 58 | 58 | - | - | - | - | - | - | - | - | - | - |
| 5d.4.4 | NRC ISFSI Fees | - | - | - | - | - | - | 4 | 0 | 4 | - | 4 | - | - | - | - | - | - | - | - | - |
| 5d.4.5 | Emergency Planning Fees | - | - | - | - | - | - | 3 | 0 | 3 | - | 3 | - | - | - | - | - | - | - | - | - |
| 5d.4.6 | Fixed Overhead | - | - | - | - | - | - | 6 | 1 | 7 | 7 | - | 3 | - | - | - | - | - | - | - | - |
| 5d.4.7 | Railroad Track Maintenance | - | - | - | - | - | - | 2 | 0 | 3 | - | 3 | - | - | - | - | - | - | - | - | - |
| 5d.4.8 | Security Staff Cost | - | - | - | - | - | - | 74 | 11 | 85 | 85 | - | - | - | - | - | - | - | - | - | 1,077 |
| 5d.4.9 | Utility Staff Cost | - | - | - | - | - | - | 19 | 3 | 22 | 22 | - | - | - | - | - | - | - | - | - | 269 |
| 5d.4 | Subtotal Period 5d Period-Dependent Costs | - | - | - | - | - | - | 171 | 22 | 194 | 186 | 7 | - | - | - | - | - | - | - | - | 1,346 |
| 5d.0 | TOTAL PERIOD 5d COST | - | - | 1,444 | - | - | 8,680 | 247 | 1,689 | 12,060 | 11,973 | 87 | - | - | - | - | - | 1,773 | 344,823 | - | 1,346 |
| PERIOD 5e - ISFSI Decontamination | | | | | | | | | | | | | | | | | | | | | |
| Period 5e Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| Period 5e Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 5e.2.1 | License Termination ISFSI | - | 0 | 2 | 17 | - | 142 | 1,197 | 339 | 1,696 | 1,696 | - | - | - | 424 | - | - | - | 65,754 | 5,882 | 1,161 |
| 5e.2 | Subtotal Period 5e Additional Costs | - | 0 | 2 | 17 | - | 142 | 1,197 | 339 | 1,696 | 1,696 | - | - | - | 424 | - | - | - | 65,754 | 5,882 | 1,161 |

**Prairie Island Nuclear Generating Plant
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**Table I-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with 100 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| Period 5e Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 5e.4.1 | Insurance | - | - | - | - | - | - | 93 | 23 | 116 | 116 | - | - | - | - | - | - | - | - | - | - |
| 5e.4.2 | Property taxes | - | - | - | - | - | - | 56 | 14 | 69 | 69 | - | - | - | - | - | - | - | - | - | - |
| 5e.4.3 | Plant energy budget | - | - | - | - | - | - | 11 | 3 | 13 | 13 | - | - | - | - | - | - | - | - | - | - |
| 5e.4.4 | Fixed Overhead | - | - | - | - | - | - | 54 | 14 | 68 | 68 | - | - | - | - | - | - | - | - | - | - |
| 5e.4.5 | Railroad Track Maintenance | - | - | - | - | - | - | 21 | 5 | 26 | 26 | - | - | - | - | - | - | - | - | - | - |
| 5e.4.6 | Security Staff Cost | - | - | - | - | - | - | 174 | 43 | 217 | 217 | - | - | - | - | - | - | - | - | - | 2,500 |
| 5e.4.7 | Utility Staff Cost | - | - | - | - | - | - | 129 | 32 | 161 | 161 | - | - | - | - | - | - | - | - | - | 1,896 |
| 5e.4 | Subtotal Period 5e Period-Dependent Costs | - | - | - | - | - | - | 536 | 134 | 670 | 670 | - | - | - | - | - | - | - | - | - | 4,396 |
| 5e.0 | TOTAL PERIOD 5e COST | - | 0 | 2 | 17 | - | 142 | 1,733 | 473 | 2,367 | 2,367 | - | - | - | 424 | - | - | - | 65,754 | 5,882 | 5,556 |
| PERIOD 5f - ISFSI Site Restoration | | | | | | | | | | | | | | | | | | | | | |
| Period 5f Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| Period 5f Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 5f.2.1 | Demolition and Site Restoration of ISFSI | - | 1,121 | - | - | - | - | 161 | 192 | 1,474 | - | - | 1,474 | - | - | - | - | - | - | 4,846 | 80 |
| 5f.2 | Subtotal Period 5f Additional Costs | - | 1,121 | - | - | - | - | 161 | 192 | 1,474 | - | - | 1,474 | - | - | - | - | - | - | 4,846 | 80 |
| Period 5f Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 5f.3.1 | Small tool allowance | - | 7 | - | - | - | - | - | 1 | 8 | - | - | 8 | - | - | - | - | - | - | - | - |
| 5f.3 | Subtotal Period 5f Collateral Costs | - | 7 | - | - | - | - | - | 1 | 8 | - | - | 8 | - | - | - | - | - | - | - | - |
| Period 5f Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 5f.4.2 | Property taxes | - | - | - | - | - | - | 28 | 3 | 31 | - | - | 31 | - | - | - | - | - | - | - | - |
| 5f.4.3 | Heavy equipment rental | - | 59 | - | - | - | - | - | 9 | 68 | - | - | 68 | - | - | - | - | - | - | - | - |
| 5f.4.4 | Plant energy budget | - | - | - | - | - | - | 6 | 1 | 6 | - | - | 6 | - | - | - | - | - | - | - | - |
| 5f.4.5 | Fixed Overhead | - | - | - | - | - | - | 28 | 4 | 32 | - | - | 32 | - | - | - | - | - | - | - | - |
| 5f.4.6 | Railroad Track Maintenance | - | - | - | - | - | - | 11 | 2 | 12 | - | - | 12 | - | - | - | - | - | - | - | - |
| 5f.4.7 | Security Staff Cost | - | - | - | - | - | - | 89 | 13 | 102 | - | - | 102 | - | - | - | - | - | - | - | 1,281 |
| 5f.4.8 | Utility Staff Cost | - | - | - | - | - | - | 55 | 8 | 63 | - | - | 63 | - | - | - | - | - | - | - | 795 |
| 5f.4 | Subtotal Period 5f Period-Dependent Costs | - | 59 | - | - | - | - | 216 | 40 | 315 | - | - | 315 | - | - | - | - | - | - | - | 2,076 |
| 5f.0 | TOTAL PERIOD 5f COST | - | 1,187 | - | - | - | - | 377 | 233 | 1,798 | - | - | 1,798 | - | - | - | - | - | - | 4,846 | 2,156 |
| PERIOD 5 TOTALS | | - | 40,644 | 1,525 | 435 | - | 11,212 | 274,611 | 42,889 | 371,316 | 18,078 | 281,684 | 71,553 | - | 9,353 | - | - | 1,773 | 1,470,189 | 178,175 | 1,232,291 |
| TOTAL COST TO DECOMMISSION | | 12,610 | 122,384 | 21,327 | 7,312 | 27,293 | 47,794 | 1,413,637 | 242,212 | 1,894,569 | 983,908 | 832,007 | 78,655 | 172,234 | 167,056 | 125 | 673 | 1,773 | 16,288,180 | 950,825 | 7,429,280 |

| | | |
|--|--------------------|----------------------------------|
| TOTAL COST TO DECOMMISSION WITH 14.66% CONTINGENCY: | \$1,894,569 | thousands of 2020 dollars |
| TOTAL NRC LICENSE TERMINATION COST IS 51.93% OR: | \$983,908 | thousands of 2020 dollars |
| SPENT FUEL MANAGEMENT COST IS 43.92% OR: | \$832,007 | thousands of 2020 dollars |
| NON-NUCLEAR DEMOLITION COST IS 4.15% OR: | \$78,655 | thousands of 2020 dollars |
| TOTAL LOW-LEVEL RADIOACTIVE WASTE VOLUME BURIED (EXCLUDING GTCC): | 167,854 | Cubic Feet |
| TOTAL GREATER THAN CLASS C RADWASTE VOLUME GENERATED: | 1,773 | Cubic Feet |
| TOTAL SCRAP METAL REMOVED: | 42,406 | Tons |
| TOTAL CRAFT LABOR REQUIREMENTS: | 950,825 | Man-hours |

End Notes:
n/a - indicates that this activity not charged as decommissioning expense
a - indicates that this activity performed by decommissioning staff
0 - indicates that this value is less than 0.5 but is non-zero
A cell containing "-" indicates a zero value

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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APPENDIX J

DETAILED COST ANALYSIS

SCENARIO 8: SAFSTOR with 200 Year DFS

| | <u>Page</u> |
|---|-------------|
| Prairie Island Nuclear Generating Plant, Unit 1 | J-2 |
| Prairie Island Nuclear Generating Plant, Unit 2 | J-14 |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table J-1
Prairie Island SAFSTOR Unit 1
SAFSTOR Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|--|--|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| PERIOD 1a - Shutdown through Transition | | | | | | | | | | | | | | | | | | | | | |
| Period 1a Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| 1a.1.1 | SAFSTOR site characterization survey | - | - | - | - | - | - | 415 | 124 | 539 | 539 | - | - | - | - | - | - | - | - | - | - |
| 1a.1.2 | Prepare preliminary decommissioning cost | - | - | - | - | - | - | 167 | 25 | 192 | 192 | - | - | - | - | - | - | - | - | - | 1,300 |
| 1a.1.3 | Notification of Cessation of Operations | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.4 | Remove fuel & source material | - | - | - | - | - | - | - | - | n/a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.5 | Notification of Permanent Defueling | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.6 | Deactivate plant systems & process waste | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.7 | Prepare and submit PSDAR | - | - | - | - | - | - | 257 | 39 | 296 | 296 | - | - | - | - | - | - | - | - | - | 2,000 |
| 1a.1.8 | Review plant dwgs & specs. | - | - | - | - | - | - | 167 | 25 | 192 | 192 | - | - | - | - | - | - | - | - | - | 1,300 |
| 1a.1.9 | Perform detailed rad survey | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.10 | Estimate by-product inventory | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| 1a.1.11 | End product description | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| 1a.1.12 | Detailed by-product inventory | - | - | - | - | - | - | 193 | 29 | 222 | 222 | - | - | - | - | - | - | - | - | - | 1,500 |
| 1a.1.13 | Define major work sequence | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| 1a.1.14 | Perform SER and EA | - | - | - | - | - | - | 398 | 60 | 458 | 458 | - | - | - | - | - | - | - | - | - | 3,100 |
| 1a.1.15 | Prepare/submit Defueled Technical Specifications | - | - | - | - | - | - | 964 | 145 | 1,108 | 1,108 | - | - | - | - | - | - | - | - | - | 7,500 |
| 1a.1.16 | Perform Site-Specific Cost Study | - | - | - | - | - | - | 643 | 96 | 739 | 739 | - | - | - | - | - | - | - | - | - | 5,000 |
| 1a.1.17 | Prepare/submit Irradiated Fuel Management Plan | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| Activity Specifications | | | | | | | | | | | | | | | | | | | | | |
| 1a.1.18.1 | Prepare plant and facilities for SAFSTOR | - | - | - | - | - | - | 632 | 95 | 727 | 727 | - | - | - | - | - | - | - | - | - | 4,920 |
| 1a.1.18.2 | Plant systems | - | - | - | - | - | - | 536 | 80 | 616 | 616 | - | - | - | - | - | - | - | - | - | 4,167 |
| 1a.1.18.3 | Plant structures and buildings | - | - | - | - | - | - | 401 | 60 | 461 | 461 | - | - | - | - | - | - | - | - | - | 3,120 |
| 1a.1.18.4 | Waste management | - | - | - | - | - | - | 257 | 39 | 296 | 296 | - | - | - | - | - | - | - | - | - | 2,000 |
| 1a.1.18.5 | Facility and site dormancy | - | - | - | - | - | - | 257 | 39 | 296 | 296 | - | - | - | - | - | - | - | - | - | 2,000 |
| 1a.1.18 | Total | - | - | - | - | - | - | 2,083 | 312 | 2,395 | 2,395 | - | - | - | - | - | - | - | - | - | 16,207 |
| Detailed Work Procedures | | | | | | | | | | | | | | | | | | | | | |
| 1a.1.19.1 | Plant systems | - | - | - | - | - | - | 152 | 23 | 175 | 175 | - | - | - | - | - | - | - | - | - | 1,183 |
| 1a.1.19.2 | Facility closeout & dormancy | - | - | - | - | - | - | 154 | 23 | 177 | 177 | - | - | - | - | - | - | - | - | - | 1,200 |
| 1a.1.19 | Total | - | - | - | - | - | - | 306 | 46 | 352 | 352 | - | - | - | - | - | - | - | - | - | 2,383 |
| 1a.1.20 | Procure vacuum drying system | - | - | - | - | - | - | 13 | 2 | 15 | 15 | - | - | - | - | - | - | - | - | - | 100 |
| 1a.1.21 | Drain/de-energize non-cont. systems | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.22 | Drain & dry NSSS | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.23 | Drain/de-energize contaminated systems | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.24 | Decon/secure contaminated systems | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1 | Subtotal Period 1a Activity Costs | - | - | - | - | - | - | 6,120 | 980 | 7,100 | 7,100 | - | - | - | - | - | - | - | - | - | 44,390 |
| Period 1a Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 1a.3.1 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 1,249 | - | 1,249 | - | 1,249 | - | - | - | - | - | - | - | - | - |
| 1a.3 | Subtotal Period 1a Collateral Costs | - | - | - | - | - | - | 1,249 | - | 1,249 | - | 1,249 | - | - | - | - | - | - | - | - | - |
| Period 1a Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 1a.4.1 | Insurance | - | - | - | - | - | - | 1,660 | 166 | 1,826 | 1,826 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.2 | Property taxes | - | - | - | - | - | - | 3,623 | 362 | 3,985 | 3,985 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.3 | Health physics supplies | - | 614 | - | - | - | - | - | 153 | 767 | 767 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.4 | Heavy equipment rental | - | 753 | - | - | - | - | - | 113 | 866 | 866 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.5 | Disposal of DAW generated | - | - | 12 | 5 | - | 50 | - | 14 | 82 | 82 | - | - | 610 | - | - | - | - | 12,190 | 20 | - |
| 1a.4.6 | Plant energy budget | - | - | - | - | - | - | 1,621 | 243 | 1,864 | 1,864 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.7 | NRC Fees | - | - | - | - | - | - | 892 | 89 | 981 | 981 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.8 | Emergency Planning Fees | - | - | - | - | - | - | 2,174 | 217 | 2,392 | - | 2,392 | - | - | - | - | - | - | - | - | - |
| 1a.4.9 | Fixed Overhead | - | - | - | - | - | - | 1,440 | 216 | 1,656 | 1,656 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.10 | Spent Fuel Pool O&M | - | - | - | - | - | - | 422 | 63 | 486 | - | 486 | - | - | - | - | - | - | - | - | - |
| 1a.4.11 | ISFSI Operating Costs | - | - | - | - | - | - | 56 | 8 | 64 | - | 64 | - | - | - | - | - | - | - | - | - |
| 1a.4.12 | Railroad Track Maintenance | - | - | - | - | - | - | 63 | 9 | 72 | - | 72 | - | - | - | - | - | - | - | - | - |
| 1a.4.13 | Security Staff Cost | - | - | - | - | - | - | 8,328 | 1,249 | 9,577 | 9,577 | - | - | - | - | - | - | - | - | - | 122,720 |
| 1a.4.14 | Utility Staff Cost | - | - | - | - | - | - | 26,931 | 4,040 | 30,971 | 30,971 | - | - | - | - | - | - | - | - | - | 422,240 |
| 1a.4 | Subtotal Period 1a Period-Dependent Costs | - | 1,367 | 12 | 5 | - | 50 | 47,211 | 6,945 | 55,590 | 52,648 | 2,942 | - | 610 | - | - | - | - | 12,190 | 20 | 544,960 |
| 1a.0 | TOTAL PERIOD 1a COST | - | 1,367 | 12 | 5 | - | 50 | 54,580 | 7,925 | 63,939 | 59,748 | 4,191 | - | 610 | - | - | - | - | 12,190 | 20 | 589,350 |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table J-1
Prairie Island SAFSTOR Unit 1
SAFSTOR Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|--|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|---------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| PERIOD 1b - SAFSTOR Limited DECON Activities | | | | | | | | | | | | | | | | | | | | | | |
| Period 1b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Decontamination of Site Buildings | | | | | | | | | | | | | | | | | | | | | | |
| 1b.1.1.1 | Reactor | 1,199 | - | - | - | - | - | - | 599 | 1,798 | 1,798 | - | - | - | - | - | - | - | - | - | 17,003 | - |
| 1b.1.1 | Totals | 1,199 | - | - | - | - | - | - | 599 | 1,798 | 1,798 | - | - | - | - | - | - | - | - | - | 17,003 | - |
| 1b.1 | Subtotal Period 1b Activity Costs | 1,199 | - | - | - | - | - | - | 599 | 1,798 | 1,798 | - | - | - | - | - | - | - | - | - | 17,003 | - |
| Period 1b Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 1b.2.1 | Spent Fuel Pool Isolation | - | - | - | - | - | - | 12,675 | 1,901 | 14,576 | 14,576 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.2 | Subtotal Period 1b Additional Costs | - | - | - | - | - | - | 12,675 | 1,901 | 14,576 | 14,576 | - | - | - | - | - | - | - | - | - | - | - |
| Period 1b Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 1b.3.1 | Decon equipment | 1,055 | - | - | - | - | - | - | 158 | 1,213 | 1,213 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.3.2 | Process decommissioning water waste | 79 | - | 52 | 94 | - | 212 | - | 112 | 549 | 549 | - | - | - | 487 | - | - | - | - | 29,193 | 95 | - |
| 1b.3.4 | Small tool allowance | - | 20 | - | - | - | - | - | 3 | 23 | 23 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.3.5 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 311 | - | 311 | - | 311 | - | - | - | - | - | - | - | - | - | - |
| 1b.3 | Subtotal Period 1b Collateral Costs | 1,134 | 20 | 52 | 94 | - | 212 | 311 | 273 | 2,097 | 1,785 | 311 | - | - | 487 | - | - | - | - | 29,193 | 95 | - |
| Period 1b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 1b.4.1 | Decon supplies | 449 | - | - | - | - | - | - | 112 | 561 | 561 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.2 | Insurance | - | - | - | - | - | - | 414 | 41 | 455 | 455 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.3 | Property taxes | - | - | - | - | - | - | 903 | 90 | 994 | 994 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.4 | Health physics supplies | - | 250 | - | - | - | - | - | 63 | 313 | 313 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.5 | Heavy equipment rental | - | 188 | - | - | - | - | - | 28 | 216 | 216 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.6 | Disposal of DAW generated | - | - | 6 | 3 | - | 27 | - | 8 | 43 | 43 | - | - | - | 324 | - | - | - | - | 6,486 | 11 | - |
| 1b.4.7 | Plant energy budget | - | - | - | - | - | - | 404 | 61 | 465 | 465 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.8 | NRC Fees | - | - | - | - | - | - | 161 | 16 | 177 | 177 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.9 | Emergency Planning Fees | - | - | - | - | - | - | 542 | 54 | 596 | - | 596 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.10 | Fixed Overhead | - | - | - | - | - | - | 359 | 54 | 413 | 413 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.11 | Spent Fuel Pool O&M | - | - | - | - | - | - | 105 | 16 | 121 | - | 121 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.12 | ISFSI Operating Costs | - | - | - | - | - | - | 14 | 2 | 16 | - | 16 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.13 | Railroad Track Maintenance | - | - | - | - | - | - | 16 | 2 | 18 | 18 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.14 | Security Staff Cost | - | - | - | - | - | - | 2,076 | 311 | 2,388 | 2,388 | - | - | - | - | - | - | - | - | - | - | 30,596 |
| 1b.4.15 | Utility Staff Cost | - | - | - | - | - | - | 6,714 | 1,007 | 7,722 | 7,722 | - | - | - | - | - | - | - | - | - | - | 105,271 |
| 1b.4 | Subtotal Period 1b Period-Dependent Costs | 449 | 438 | 6 | 3 | - | 27 | 11,709 | 1,866 | 14,498 | 13,764 | 733 | - | - | 324 | - | - | - | - | 6,486 | 11 | 135,867 |
| 1b.0 | TOTAL PERIOD 1b COST | 2,781 | 458 | 59 | 97 | - | 239 | 24,696 | 4,640 | 32,969 | 31,924 | 1,045 | - | - | 811 | - | - | - | - | 35,678 | 17,108 | 135,867 |
| PERIOD 1c - Preparations for SAFSTOR Dormancy | | | | | | | | | | | | | | | | | | | | | | |
| Period 1c Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| 1c.1.1 | Prepare support equipment for storage | - | 527 | - | - | - | - | - | 79 | 606 | 606 | - | - | - | - | - | - | - | - | - | 3,000 | - |
| 1c.1.2 | Install containment pressure equal. lines | - | 54 | - | - | - | - | - | 8 | 62 | 62 | - | - | - | - | - | - | - | - | - | 700 | - |
| 1c.1.3 | Interim survey prior to dormancy | - | - | - | - | - | - | 733 | 220 | 953 | 953 | - | - | - | - | - | - | - | - | - | 12,801 | - |
| 1c.1.4 | Secure building accesses | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - | - |
| 1c.1.5 | Prepare & submit interim report | - | - | - | - | - | - | 75 | 11 | 86 | 86 | - | - | - | - | - | - | - | - | - | - | 583 |
| 1c.1 | Subtotal Period 1c Activity Costs | - | 581 | - | - | - | - | 808 | 318 | 1,707 | 1,707 | - | - | - | - | - | - | - | - | - | 16,501 | 583 |
| Period 1c Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 1c.3.1 | Process decommissioning water waste | 91 | - | 60 | 109 | - | 245 | - | 129 | 634 | 634 | - | - | - | 561 | - | - | - | - | 33,685 | 109 | - |
| 1c.3.3 | Small tool allowance | - | 5 | - | - | - | - | - | 1 | 6 | 6 | - | - | - | - | - | - | - | - | - | - | - |
| 1c.3.4 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 163 | 25 | 188 | - | 188 | - | - | - | - | - | - | - | - | - | - |
| 1c.3.5 | Retention and Severance | - | - | - | - | - | - | 1,032 | 155 | 1,187 | 1,187 | - | - | - | - | - | - | - | - | - | - | - |
| 1c.3.6 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 311 | - | 311 | - | 311 | - | - | - | - | - | - | - | - | - | - |
| 1c.3 | Subtotal Period 1c Collateral Costs | 91 | 5 | 60 | 109 | - | 245 | 1,507 | 309 | 2,325 | 1,826 | 499 | - | - | 561 | - | - | - | - | 33,685 | 109 | - |
| Period 1c Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 1c.4.1 | Insurance | - | - | - | - | - | - | 414 | 41 | 455 | 455 | - | - | - | - | - | - | - | - | - | - | - |
| 1c.4.2 | Property taxes | - | - | - | - | - | - | 903 | 90 | 994 | 994 | - | - | - | - | - | - | - | - | - | - | - |
| 1c.4.3 | Health physics supplies | - | 248 | - | - | - | - | - | 62 | 309 | 309 | - | - | - | - | - | - | - | - | - | - | - |
| 1c.4.4 | Heavy equipment rental | - | 188 | - | - | - | - | - | 28 | 216 | 216 | - | - | - | - | - | - | - | - | - | - | - |
| 1c.4.5 | Disposal of DAW generated | - | - | 3 | 1 | - | 13 | - | 4 | 20 | 20 | - | - | - | 152 | - | - | - | - | 3,039 | 5 | - |
| 1c.4.6 | Plant energy budget | - | - | - | - | - | - | 404 | 61 | 465 | 465 | - | - | - | - | - | - | - | - | - | - | - |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table J-1
Prairie Island SAFSTOR Unit 1
SAFSTOR Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|---|--------------|--------------|-----------------|-----------------|---------------------------|---------------------|---------------|-------------------|----------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| Period 1c Period-Dependent Costs (continued) | | | | | | | | | | | | | | | | | | | | | |
| 1c.4.7 | NRC Fees | - | - | - | - | - | - | 161 | 16 | 177 | 177 | - | - | - | - | - | - | - | - | - | - |
| 1c.4.8 | Emergency Planning Fees | - | - | - | - | - | - | 542 | 54 | 596 | - | 596 | - | - | - | - | - | - | - | - | - |
| 1c.4.9 | Fixed Overhead | - | - | - | - | - | - | 359 | 54 | 413 | 413 | - | - | - | - | - | - | - | - | - | - |
| 1c.4.10 | Spent Fuel Pool O&M | - | - | - | - | - | - | 105 | 16 | 121 | - | 121 | - | - | - | - | - | - | - | - | - |
| 1c.4.11 | ISFSI Operating Costs | - | - | - | - | - | - | 14 | 2 | 16 | - | 16 | - | - | - | - | - | - | - | - | - |
| 1c.4.12 | Railroad Track Maintenance | - | - | - | - | - | - | 16 | 2 | 18 | 18 | - | - | - | - | - | - | - | - | - | - |
| 1c.4.13 | Security Staff Cost | - | - | - | - | - | - | 2,076 | 311 | 2,388 | 2,388 | - | - | - | - | - | - | - | - | - | 30,596 |
| 1c.4.14 | Utility Staff Cost | - | - | - | - | - | - | 6,714 | 1,007 | 7,722 | 7,722 | - | - | - | - | - | - | - | - | - | 105,271 |
| 1c.4 | Subtotal Period 1c Period-Dependent Costs | - | 435 | 3 | 1 | - | 13 | 11,709 | 1,749 | 13,910 | 13,177 | 733 | - | - | 152 | - | - | - | 3,039 | 5 | 135,867 |
| 1c.0 | TOTAL PERIOD 1c COST | 91 | 1,021 | 63 | 110 | - | 257 | 14,024 | 2,376 | 17,943 | 16,710 | 1,233 | - | - | 713 | - | - | - | 36,724 | 16,615 | 136,450 |
| PERIOD 1 TOTALS | | 2,873 | 2,846 | 134 | 212 | - | 546 | 93,299 | 14,941 | 114,851 | 108,382 | 6,468 | - | - | 2,134 | - | - | - | 84,593 | 33,743 | 861,667 |
| PERIOD 2a - SAFSTOR Dormancy with Wet Spent Fuel Storage | | | | | | | | | | | | | | | | | | | | | |
| Period 2a Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| 2a.1.1 | Quarterly Inspection | - | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - |
| 2a.1.2 | Semi-annual environmental survey | - | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - |
| 2a.1.3 | Prepare reports | - | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - |
| 2a.1.4 | Bituminous roof replacement | - | - | - | - | - | - | 54 | 8 | 62 | 62 | - | - | - | - | - | - | - | - | - | - |
| 2a.1.5 | Maintenance supplies | - | - | - | - | - | - | 520 | 130 | 650 | 650 | - | - | - | - | - | - | - | - | - | - |
| 2a.1 | Subtotal Period 2a Activity Costs | - | - | - | - | - | - | 574 | 138 | 712 | 712 | - | - | - | - | - | - | - | - | - | - |
| Period 2a Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 2a.2.1 | Security Modifications | - | - | - | - | - | - | 4,348 | 652 | 5,000 | 5,000 | - | - | - | - | - | - | - | - | - | - |
| 2a.2 | Subtotal Period 2a Additional Costs | - | - | - | - | - | - | 4,348 | 652 | 5,000 | 5,000 | - | - | - | - | - | - | - | - | - | - |
| Period 2a Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 2a.3.1 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 66,237 | 9,936 | 76,173 | - | 76,173 | - | - | - | - | - | - | - | - | - |
| 2a.3.2 | Retention and Severance | - | - | - | - | - | - | 22,434 | 3,365 | 25,799 | 25,799 | - | - | - | - | - | - | - | - | - | - |
| 2a.3.3 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 4,654 | - | 4,654 | - | 4,654 | - | - | - | - | - | - | - | - | - |
| 2a.3 | Subtotal Period 2a Collateral Costs | - | - | - | - | - | - | 93,325 | 13,301 | 106,626 | 25,799 | 80,827 | - | - | - | - | - | - | - | - | - |
| Period 2a Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 2a.4.1 | Insurance | - | - | - | - | - | - | 1,804 | 180 | 1,985 | 1,985 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.2 | Property taxes | - | - | - | - | - | - | 13,489 | 1,349 | 14,838 | 14,838 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.3 | Health physics supplies | - | 801 | - | - | - | - | - | 200 | 1,001 | 1,001 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.4 | Disposal of DAW generated | - | - | 14 | 6 | - | 59 | - | 17 | 96 | 96 | - | - | 714 | - | - | - | - | 14,273 | 23 | - |
| 2a.4.5 | Plant energy budget | - | - | - | - | - | - | 1,208 | 181 | 1,389 | 1,389 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.6 | NRC Fees | - | - | - | - | - | - | 908 | 91 | 999 | 999 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.7 | Emergency Planning Fees | - | - | - | - | - | - | 6,924 | 692 | 7,616 | - | 7,616 | - | - | - | - | - | - | - | - | - |
| 2a.4.8 | Fixed Overhead | - | - | - | - | - | - | 4,432 | 665 | 5,097 | 5,097 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.9 | Spent Fuel Pool O&M | - | - | - | - | - | - | 1,573 | 236 | 1,809 | - | 1,809 | - | - | - | - | - | - | - | - | - |
| 2a.4.10 | ISFSI Operating Costs | - | - | - | - | - | - | 209 | 31 | 240 | - | 240 | - | - | - | - | - | - | - | - | - |
| 2a.4.11 | Railroad Track Maintenance | - | - | - | - | - | - | 462 | 69 | 531 | 531 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.12 | Security Staff Cost | - | - | - | - | - | - | 29,334 | 4,400 | 33,734 | 24,289 | 9,446 | - | - | - | - | - | - | - | - | 431,215 |
| 2a.4.13 | Utility Staff Cost | - | - | - | - | - | - | 3,645 | 547 | 4,192 | 3,517 | 675 | - | - | - | - | - | - | - | - | 58,126 |
| 2a.4 | Subtotal Period 2a Period-Dependent Costs | - | 801 | 14 | 6 | - | 59 | 63,988 | 8,659 | 73,527 | 53,741 | 19,786 | - | 714 | - | - | - | - | 14,273 | 23 | 489,341 |
| 2a.0 | TOTAL PERIOD 2a COST | - | 801 | 14 | 6 | - | 59 | 162,235 | 22,750 | 185,865 | 85,251 | 100,614 | - | 714 | - | - | - | - | 14,273 | 23 | 489,341 |
| PERIOD 2b - SAFSTOR Dormancy with Dry Spent Fuel Storage | | | | | | | | | | | | | | | | | | | | | |
| Period 2b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| 2b.1.1 | Quarterly Inspection | - | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - |
| 2b.1.2 | Semi-annual environmental survey | - | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - |
| 2b.1.3 | Prepare reports | - | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - |
| 2b.1.4 | Bituminous roof replacement | - | - | - | - | - | - | 704 | 106 | 810 | 810 | - | - | - | - | - | - | - | - | - | - |
| 2b.1.5 | Maintenance supplies | - | - | - | - | - | - | 6,792 | 1,698 | 8,490 | 8,490 | - | - | - | - | - | - | - | - | - | - |
| 2b.1 | Subtotal Period 2b Activity Costs | - | - | - | - | - | - | 7,496 | 1,804 | 9,300 | 9,300 | - | - | - | - | - | - | - | - | - | - |
| Period 2b Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 2b.3.1 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 122,995 | 18,449 | 141,444 | - | 141,444 | - | - | - | - | - | - | - | - | - |
| 2b.3.2 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 60,797 | - | 60,797 | - | 60,797 | - | - | - | - | - | - | - | - | - |
| 2b.3 | Subtotal Period 2b Collateral Costs | - | - | - | - | - | - | 183,792 | 18,449 | 202,241 | - | 202,241 | - | - | - | - | - | - | - | - | - |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table J-1
Prairie Island SAFSTOR Unit 1
SAFSTOR Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|-----------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| Period 2b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 2b.4.1 | Insurance | - | - | - | - | - | - | 23,569 | 2,357 | 25,926 | 25,926 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.2 | Property taxes | - | - | - | - | - | - | 176,207 | 17,621 | 193,828 | 193,828 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.3 | Health physics supplies | - | 5,528 | - | - | - | - | - | 1,382 | 6,910 | 6,910 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.4 | Disposal of DAW generated | - | - | 100 | 40 | - | 414 | - | 120 | 674 | 674 | - | - | - | 5,027 | - | - | - | - | 100,550 | 164 | - |
| 2b.4.5 | Plant energy budget | - | - | - | - | - | - | 7,891 | 1,184 | 9,075 | 9,075 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.6 | NRC Fees | - | - | - | - | - | - | 11,071 | 1,107 | 12,178 | 12,178 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.7 | Emergency Planning Fees | - | - | - | - | - | - | 3,608 | 361 | 3,969 | - | 3,969 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.8 | Fixed Overhead | - | - | - | - | - | - | 7,930 | 1,190 | 9,120 | 9,120 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.9 | ISFSI Operating Costs | - | - | - | - | - | - | 2,724 | 409 | 3,132 | - | 3,132 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.10 | Railroad Track Maintenance | - | - | - | - | - | - | 3,043 | 456 | 3,499 | 3,499 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.11 | Security Staff Cost | - | - | - | - | - | - | 135,841 | 20,376 | 156,217 | 34,368 | 121,849 | - | - | - | - | - | - | - | - | - | 1,822,251 |
| 2b.4.12 | Utility Staff Cost | - | - | - | - | - | - | 66,470 | 9,970 | 76,440 | 48,005 | 28,436 | - | - | - | - | - | - | - | - | - | 1,012,362 |
| 2b.4 | Subtotal Period 2b Period-Dependent Costs | - | 5,528 | 100 | 40 | - | 414 | 438,354 | 56,532 | 500,968 | 343,582 | 157,386 | - | - | 5,027 | - | - | - | - | 100,550 | 164 | 2,834,613 |
| 2b.0 | TOTAL PERIOD 2b COST | - | 5,528 | 100 | 40 | - | 414 | 629,642 | 76,785 | 712,510 | 352,882 | 359,628 | - | - | 5,027 | - | - | - | - | 100,550 | 164 | 2,834,613 |
| PERIOD 2 TOTALS | | - | 6,329 | 114 | 46 | - | 473 | 791,877 | 99,535 | 898,374 | 438,133 | 460,241 | - | - | 5,741 | - | - | - | - | 114,823 | 187 | 3,323,954 |
| PERIOD 3a - Reactivate Site Following SAFSTOR Dormancy | | | | | | | | | | | | | | | | | | | | | | |
| Period 3a Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| 3a.1.1 | Prepare preliminary decommissioning cost | - | - | - | - | - | - | 167 | 25 | 192 | 192 | - | - | - | - | - | - | - | - | - | - | 1,300 |
| 3a.1.2 | Review plant dwgs & specs. | - | - | - | - | - | - | 591 | 89 | 680 | 680 | - | - | - | - | - | - | - | - | - | - | 4,600 |
| 3a.1.3 | Perform detailed rad survey | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - | - |
| 3a.1.4 | End product description | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | - | 1,000 |
| 3a.1.5 | Detailed by-product inventory | - | - | - | - | - | - | 167 | 25 | 192 | 192 | - | - | - | - | - | - | - | - | - | - | 1,300 |
| 3a.1.6 | Define major work sequence | - | - | - | - | - | - | 964 | 145 | 1,108 | 1,108 | - | - | - | - | - | - | - | - | - | - | 7,500 |
| 3a.1.7 | Perform SER and EA | - | - | - | - | - | - | 398 | 60 | 458 | 458 | - | - | - | - | - | - | - | - | - | - | 3,100 |
| 3a.1.8 | Perform Site-Specific Cost Study | - | - | - | - | - | - | 643 | 96 | 739 | 739 | - | - | - | - | - | - | - | - | - | - | 5,000 |
| Activity Specifications | | | | | | | | | | | | | | | | | | | | | | |
| 3a.1.9.1 | Re-activate plant & temporary facilities | - | - | - | - | - | - | 947 | 142 | 1,089 | 980 | - | 109 | - | - | - | - | - | - | - | - | 7,370 |
| 3a.1.9.2 | Plant systems | - | - | - | - | - | - | 536 | 80 | 616 | 554 | - | 62 | - | - | - | - | - | - | - | - | 4,167 |
| 3a.1.9.3 | Reactor internals | - | - | - | - | - | - | 912 | 137 | 1,049 | 1,049 | - | - | - | - | - | - | - | - | - | - | 7,100 |
| 3a.1.9.4 | Reactor vessel | - | - | - | - | - | - | 835 | 125 | 961 | 961 | - | - | - | - | - | - | - | - | - | - | 6,500 |
| 3a.1.9.5 | Biological shield | - | - | - | - | - | - | 64 | 10 | 74 | 74 | - | - | - | - | - | - | - | - | - | - | 500 |
| 3a.1.9.6 | Steam generators | - | - | - | - | - | - | 401 | 60 | 461 | 461 | - | - | - | - | - | - | - | - | - | - | 3,120 |
| 3a.1.9.7 | Reinforced concrete | - | - | - | - | - | - | 206 | 31 | 236 | 118 | - | 118 | - | - | - | - | - | - | - | - | 1,600 |
| 3a.1.9.8 | Main Turbine | - | - | - | - | - | - | 51 | 8 | 59 | - | - | 59 | - | - | - | - | - | - | - | - | 400 |
| 3a.1.9.9 | Main Condensers | - | - | - | - | - | - | 51 | 8 | 59 | - | - | 59 | - | - | - | - | - | - | - | - | 400 |
| 3a.1.9.10 | Plant structures & buildings | - | - | - | - | - | - | 401 | 60 | 461 | 231 | - | 231 | - | - | - | - | - | - | - | - | 3,120 |
| 3a.1.9.11 | Waste management | - | - | - | - | - | - | 591 | 89 | 680 | 680 | - | - | - | - | - | - | - | - | - | - | 4,600 |
| 3a.1.9.12 | Facility & site closeout | - | - | - | - | - | - | 116 | 17 | 133 | 67 | - | 67 | - | - | - | - | - | - | - | - | 900 |
| 3a.1.9 | Total | - | - | - | - | - | - | 5,112 | 767 | 5,879 | 5,175 | - | 704 | - | - | - | - | - | - | - | - | 39,777 |
| Planning & Site Preparations | | | | | | | | | | | | | | | | | | | | | | |
| 3a.1.10 | Prepare dismantling sequence | - | - | - | - | - | - | 308 | 46 | 355 | 355 | - | - | - | - | - | - | - | - | - | - | 2,400 |
| 3a.1.11 | Plant prep. & temp. svces | - | - | - | - | - | - | 3,500 | 525 | 4,025 | 4,025 | - | - | - | - | - | - | - | - | - | - | - |
| 3a.1.12 | Design water clean-up system | - | - | - | - | - | - | 180 | 27 | 207 | 207 | - | - | - | - | - | - | - | - | - | - | 1,400 |
| 3a.1.13 | Rigging/Cont. Cntrl Envlps/tooling/etc. | - | - | - | - | - | - | 2,400 | 360 | 2,760 | 2,760 | - | - | - | - | - | - | - | - | - | - | - |
| 3a.1.14 | Procure casks/liners & containers | - | - | - | - | - | - | 158 | 24 | 182 | 182 | - | - | - | - | - | - | - | - | - | - | 1,230 |
| 3a.1 | Subtotal Period 3a Activity Costs | - | - | - | - | - | - | 14,717 | 2,208 | 16,925 | 16,221 | - | 704 | - | - | - | - | - | - | - | - | 68,607 |
| Period 3a Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3a.2.1 | Site Characterization | - | - | - | - | - | - | 3,520 | 1,056 | 4,576 | 4,576 | - | - | - | - | - | - | - | - | - | 21,020 | 8,332 |
| 3a.2.2 | Mixed/Hazardous Waste | - | - | 353 | 94 | 178 | - | - | 76 | 702 | 702 | - | - | 6,132 | - | - | - | - | - | 351,977 | 2,348 | - |
| 3a.2.3 | Asbestos Abatement | - | 2,526 | 3 | 150 | - | 1,369 | - | 996 | 5,044 | 5,044 | - | - | - | 12,843 | - | - | - | - | 166,959 | 20,907 | - |
| 3a.2 | Subtotal Period 3a Additional Costs | - | 2,526 | 356 | 244 | 178 | 1,369 | 3,520 | 2,129 | 10,321 | 10,321 | - | - | 6,132 | 12,843 | - | - | - | - | 518,936 | 44,275 | 8,332 |
| Period 3a Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3a.3.1 | Small tool allowance | - | 34 | - | - | - | - | - | 5 | 39 | 39 | - | - | - | - | - | - | - | - | - | - | - |
| 3a.3.2 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 24,367 | 3,655 | 28,022 | - | 28,022 | - | - | - | - | - | - | - | - | - | - |
| 3a.3.3 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 1,249 | - | 1,249 | - | 1,249 | - | - | - | - | - | - | - | - | - | - |
| 3a.3 | Subtotal Period 3a Collateral Costs | - | 34 | - | - | - | - | 25,616 | 3,660 | 29,310 | 39 | 29,271 | - | - | - | - | - | - | - | - | - | - |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table J-1
Prairie Island SAFSTOR Unit 1
SAFSTOR Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| Period 3a Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 3a.4.1 | Insurance | - | - | - | - | - | - | 484 | 48 | 533 | 307 | 225 | - | - | - | - | - | - | - | - | - |
| 3a.4.2 | Property taxes | - | - | - | - | - | - | 3,618 | 362 | 3,980 | 2,551 | 1,429 | - | - | - | - | - | - | - | - | - |
| 3a.4.3 | Health physics supplies | - | 670 | - | - | - | - | - | 167 | 837 | 837 | - | - | - | - | - | - | - | - | - | - |
| 3a.4.4 | Heavy equipment rental | - | 753 | - | - | - | - | - | 113 | 866 | 866 | - | - | - | - | - | - | - | - | - | - |
| 3a.4.5 | Disposal of DAW generated | - | - | 10 | 4 | - | 42 | - | 12 | 69 | 69 | - | - | - | 516 | - | - | - | 10,311 | 17 | - |
| 3a.4.6 | Plant energy budget | - | - | - | - | - | - | 1,621 | 243 | 1,864 | 1,864 | - | - | - | - | - | - | - | - | - | - |
| 3a.4.7 | NRC ISFSI Fees | - | - | - | - | - | - | 42 | 4 | 46 | - | 46 | - | - | - | - | - | - | - | - | - |
| 3a.4.8 | NRC Fees | - | - | - | - | - | - | 335 | 33 | 368 | 368 | - | - | - | - | - | - | - | - | - | - |
| 3a.4.9 | Emergency Planning Fees | - | - | - | - | - | - | 74 | 7 | 82 | - | 82 | - | - | - | - | - | - | - | - | - |
| 3a.4.10 | Fixed Overhead | - | - | - | - | - | - | 1,440 | 216 | 1,656 | 1,656 | - | - | - | - | - | - | - | - | - | - |
| 3a.4.11 | ISFSI Operating Costs | - | - | - | - | - | - | 56 | 8 | 64 | - | 64 | - | - | - | - | - | - | - | - | - |
| 3a.4.12 | Railroad Track Maintenance | - | - | - | - | - | - | 63 | 9 | 72 | 72 | - | - | - | - | - | - | - | - | - | - |
| 3a.4.13 | Security Staff Cost | - | - | - | - | - | - | 4,632 | 695 | 5,327 | 5,044 | 282 | - | - | - | - | - | - | - | - | 69,160 |
| 3a.4.14 | Utility Staff Cost | - | - | - | - | - | - | 16,599 | 2,490 | 19,089 | 18,421 | 668 | - | - | - | - | - | - | - | - | 260,000 |
| 3a.4 | Subtotal Period 3a Period-Dependent Costs | - | 1,423 | 10 | 4 | - | 42 | 28,964 | 4,410 | 34,853 | 32,057 | 2,796 | - | - | 516 | - | - | - | 10,311 | 17 | 329,160 |
| 3a.0 | TOTAL PERIOD 3a COST | - | 3,983 | 366 | 248 | 178 | 1,412 | 72,817 | 12,406 | 91,409 | 58,638 | 32,067 | 704 | 6,132 | 13,359 | - | - | - | 529,247 | 44,292 | 406,099 |
| PERIOD 3b - Decommissioning Preparations | | | | | | | | | | | | | | | | | | | | | |
| Period 3b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| Detailed Work Procedures | | | | | | | | | | | | | | | | | | | | | |
| 3b.1.1.1 | Plant systems | - | - | - | - | - | - | 608 | 91 | 700 | 630 | - | 70 | - | - | - | - | - | - | - | 4,733 |
| 3b.1.1.2 | Reactor internals | - | - | - | - | - | - | 321 | 48 | 369 | 369 | - | - | - | - | - | - | - | - | - | 2,500 |
| 3b.1.1.3 | Remaining buildings | - | - | - | - | - | - | 174 | 26 | 200 | 50 | - | 150 | - | - | - | - | - | - | - | 1,350 |
| 3b.1.1.4 | CRD cooling assembly | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| 3b.1.1.5 | CRD housings & ICI tubes | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| 3b.1.1.6 | Incore instrumentation | - | - | - | - | - | - | 129 | 19 | 148 | 148 | - | - | - | - | - | - | - | - | - | 1,000 |
| 3b.1.1.7 | Reactor vessel | - | - | - | - | - | - | 467 | 70 | 537 | 537 | - | - | - | - | - | - | - | - | - | 3,630 |
| 3b.1.1.8 | Facility closeout | - | - | - | - | - | - | 154 | 23 | 177 | 89 | - | 89 | - | - | - | - | - | - | - | 1,200 |
| 3b.1.1.9 | Missile shields | - | - | - | - | - | - | 58 | 9 | 67 | 67 | - | - | - | - | - | - | - | - | - | 450 |
| 3b.1.1.10 | Biological shield | - | - | - | - | - | - | 154 | 23 | 177 | 177 | - | - | - | - | - | - | - | - | - | 1,200 |
| 3b.1.1.11 | Steam generators | - | - | - | - | - | - | 591 | 89 | 680 | 680 | - | - | - | - | - | - | - | - | - | 4,600 |
| 3b.1.1.12 | Reinforced concrete | - | - | - | - | - | - | 129 | 19 | 148 | 74 | - | 74 | - | - | - | - | - | - | - | 1,000 |
| 3b.1.1.13 | Main Turbine | - | - | - | - | - | - | 200 | 30 | 231 | - | - | 231 | - | - | - | - | - | - | - | 1,560 |
| 3b.1.1.14 | Main Condensers | - | - | - | - | - | - | 200 | 30 | 231 | - | - | 231 | - | - | - | - | - | - | - | 1,560 |
| 3b.1.1.15 | Auxiliary building | - | - | - | - | - | - | 351 | 53 | 403 | 363 | - | 40 | - | - | - | - | - | - | - | 2,730 |
| 3b.1.1.16 | Reactor building | - | - | - | - | - | - | 351 | 53 | 403 | 363 | - | 40 | - | - | - | - | - | - | - | 2,730 |
| 3b.1.1 | Total | - | - | - | - | - | - | 4,144 | 622 | 4,765 | 3,841 | - | 924 | - | - | - | - | - | - | - | 32,243 |
| 3b.1 | Subtotal Period 3b Activity Costs | - | - | - | - | - | - | 4,144 | 622 | 4,765 | 3,841 | - | 924 | - | - | - | - | - | - | - | 32,243 |
| Period 3b Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 3b.3.1 | Decon equipment | 1,055 | - | - | - | - | - | - | 158 | 1,213 | 1,213 | - | - | - | - | - | - | - | - | - | - |
| 3b.3.2 | DOC staff relocation expenses | - | - | - | - | - | - | 1,264 | 190 | 1,454 | 1,454 | - | - | - | - | - | - | - | - | - | - |
| 3b.3.3 | Pipe cutting equipment | - | 1,200 | - | - | - | - | - | 180 | 1,380 | 1,380 | - | - | - | - | - | - | - | - | - | - |
| 3b.3.4 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 26,241 | 3,936 | 30,177 | - | 30,177 | - | - | - | - | - | - | - | - | - |
| 3b.3.5 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 623 | - | 623 | - | 623 | - | - | - | - | - | - | - | - | - |
| 3b.3 | Subtotal Period 3b Collateral Costs | 1,055 | 1,200 | - | - | - | - | 28,128 | 4,464 | 34,846 | 4,047 | 30,800 | - | - | - | - | - | - | - | - | - |
| Period 3b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 3b.4.1 | Decon supplies | 38 | - | - | - | - | - | - | 9 | 47 | 47 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.2 | Insurance | - | - | - | - | - | - | 241 | 24 | 266 | 266 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.3 | Property taxes | - | - | - | - | - | - | 1,802 | 180 | 1,982 | 1,270 | 711 | - | - | - | - | - | - | - | - | - |
| 3b.4.4 | Health physics supplies | - | 295 | - | - | - | - | - | 74 | 369 | 369 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.5 | Heavy equipment rental | - | 375 | - | - | - | - | - | 56 | 432 | 432 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.6 | Disposal of DAW generated | - | - | 6 | 2 | - | 24 | - | 7 | 39 | 39 | - | - | - | 291 | - | - | - | 5,814 | 9 | - |
| 3b.4.7 | Plant energy budget | - | - | - | - | - | - | 808 | 121 | 930 | 930 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.8 | NRC ISFSI Fees | - | - | - | - | - | - | 21 | 2 | 23 | - | 23 | - | - | - | - | - | - | - | - | - |
| 3b.4.9 | NRC Fees | - | - | - | - | - | - | 167 | 17 | 183 | 183 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.10 | Emergency Planning Fees | - | - | - | - | - | - | 37 | 4 | 41 | - | 41 | - | - | - | - | - | - | - | - | - |
| 3b.4.11 | Fixed Overhead | - | - | - | - | - | - | 718 | 108 | 826 | 826 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.12 | ISFSI Operating Costs | - | - | - | - | - | - | 28 | 4 | 32 | - | 32 | - | - | - | - | - | - | - | - | - |
| 3b.4.13 | Railroad Track Maintenance | - | - | - | - | - | - | 31 | 5 | 36 | 36 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.14 | Security Staff Cost | - | - | - | - | - | - | 2,310 | 346 | 2,656 | 2,515 | 141 | - | - | - | - | - | - | - | - | 34,485 |
| 3b.4.15 | DOC Staff Cost | - | - | - | - | - | - | 5,344 | 802 | 6,146 | 6,146 | - | - | - | - | - | - | - | - | - | 58,080 |
| 3b.4.16 | Utility Staff Cost | - | - | - | - | - | - | 8,277 | 1,242 | 9,518 | 9,185 | 333 | - | - | - | - | - | - | - | - | 129,644 |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table J-1
Prairie Island SAFSTOR Unit 1
SAFSTOR Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|--|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| 3b.4 | Subtotal Period 3b Period-Dependent Costs | 38 | 671 | 6 | 2 | - | 24 | 19,784 | 3,001 | 23,525 | 22,244 | 1,281 | - | - | 291 | - | - | - | 5,814 | 9 | 222,210 |
| 3b.0 | TOTAL PERIOD 3b COST | 1,092 | 1,871 | 6 | 2 | - | 24 | 52,055 | 8,086 | 63,137 | 30,132 | 32,081 | 924 | - | 291 | - | - | - | 5,814 | 9 | 254,453 |
| PERIOD 3 TOTALS | | 1,092 | 5,853 | 372 | 251 | 178 | 1,436 | 124,872 | 20,492 | 154,546 | 88,770 | 64,148 | 1,628 | 6,132 | 13,649 | - | - | - | 535,061 | 44,301 | 660,551 |
| PERIOD 4a - Large Component Removal | | | | | | | | | | | | | | | | | | | | | |
| Period 4a Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| Nuclear Steam Supply System Removal | | | | | | | | | | | | | | | | | | | | | |
| 4a.1.1.1 | Reactor Coolant Piping | 11 | 42 | 10 | 11 | 66 | 94 | - | 52 | 285 | 285 | - | - | 240 | 254 | - | - | - | 33,680 | 778 | - |
| 4a.1.1.2 | Pressurizer Relief Tank | 5 | 19 | 6 | 7 | 44 | 62 | - | 31 | 174 | 174 | - | - | 160 | 169 | - | - | - | 22,441 | 352 | - |
| 4a.1.1.3 | Reactor Coolant Pumps & Motors | 13 | 60 | 46 | 85 | - | 463 | - | 155 | 822 | 822 | - | - | - | 2,332 | - | - | - | 295,800 | 1,226 | 80 |
| 4a.1.1.4 | Pressurizer | - | 77 | 382 | 91 | - | 776 | - | 265 | 1,591 | 1,591 | - | - | - | 2,196 | - | - | - | 158,199 | 1,346 | 750 |
| 4a.1.1.5 | Steam Generators | - | 3,307 | 1,690 | 1,743 | 2,409 | 3,885 | - | 2,590 | 15,625 | 15,625 | - | - | 18,672 | 10,990 | - | - | - | 1,581,180 | 10,253 | 2,250 |
| 4a.1.1.6 | CRDMs/ICIs/Service Structure Removal | 63 | 248 | 205 | 44 | 326 | 454 | - | 283 | 1,623 | 1,623 | - | - | 2,138 | 2,146 | - | - | - | 165,025 | 4,449 | - |
| 4a.1.1.7 | Reactor Vessel Internals | 53 | 4,650 | 13,334 | 828 | - | 8,610 | 278 | 11,401 | 39,153 | 39,153 | - | - | - | 1,174 | - | 742 | - | 167,605 | 22,373 | 1,053 |
| 4a.1.1.8 | Reactor Vessel | - | 5,835 | 1,653 | 442 | - | 3,268 | 278 | 6,576 | 18,053 | 18,053 | - | - | - | 9,245 | - | - | - | 579,324 | 22,373 | 1,053 |
| 4a.1.1 | Totals | 146 | 14,237 | 17,327 | 3,250 | 2,845 | 17,613 | 556 | 21,352 | 77,327 | 77,327 | - | - | 21,210 | 28,505 | - | 742 | - | 3,003,254 | 63,151 | 5,187 |
| Removal of Major Equipment | | | | | | | | | | | | | | | | | | | | | |
| 4a.1.2 | Main Turbine/Generator | - | 292 | 116 | 35 | 555 | - | - | 173 | 1,170 | 1,170 | - | - | 2,243 | - | - | - | - | 134,601 | 4,116 | - |
| 4a.1.3 | Main Condensers | - | 2,510 | 79 | 33 | 742 | - | - | 752 | 4,115 | 4,115 | - | - | 4,000 | - | - | - | - | 180,000 | 34,978 | - |
| Cascading Costs from Clean Building Demolition | | | | | | | | | | | | | | | | | | | | | |
| 4a.1.4.1 | Reactor | - | 794 | - | - | - | - | - | 119 | 913 | 913 | - | - | - | - | - | - | - | - | 7,589 | - |
| 4a.1.4 | Totals | - | 794 | - | - | - | - | - | 119 | 913 | 913 | - | - | - | - | - | - | - | - | 7,589 | - |
| Disposal of Plant Systems | | | | | | | | | | | | | | | | | | | | | |
| 4a.1.5.1 | Air Removal | - | 31 | - | - | - | - | - | 5 | 36 | - | - | 36 | - | - | - | - | - | - | 452 | - |
| 4a.1.5.2 | Auxiliary Feedwater | - | 46 | - | - | - | - | - | 7 | 53 | - | - | 53 | - | - | - | - | - | - | 670 | - |
| 4a.1.5.3 | Auxiliary Feedwater - RCA | - | 47 | 0 | 2 | 36 | - | - | 17 | 102 | 102 | - | - | 215 | - | - | - | - | 8,722 | 601 | - |
| 4a.1.5.4 | Bleed Steam | - | 90 | - | - | - | - | - | 14 | 104 | - | - | 104 | - | - | - | - | - | - | 1,335 | - |
| 4a.1.5.5 | Caustic Addition - RCA | - | 38 | 0 | 2 | 39 | - | - | 16 | 95 | 95 | - | - | 233 | - | - | - | - | 9,453 | 444 | - |
| 4a.1.5.6 | Chemical Feed | - | 20 | - | - | - | - | - | 3 | 23 | - | - | 23 | - | - | - | - | - | - | 304 | - |
| 4a.1.5.7 | Chemical Feed - RCA | - | 1 | 0 | 0 | 1 | - | - | 0 | 3 | 3 | - | - | 6 | - | - | - | - | 243 | 12 | - |
| 4a.1.5.8 | Circulating Water | - | 42 | - | - | - | - | - | 6 | 49 | - | - | 49 | - | - | - | - | - | - | 619 | - |
| 4a.1.5.9 | Condensate | - | 474 | - | - | - | - | - | 71 | 545 | - | - | 545 | - | - | - | - | - | - | 6,837 | - |
| 4a.1.5.10 | Condensate Polishing | - | 235 | - | - | - | - | - | 35 | 271 | - | - | 271 | - | - | - | - | - | - | 3,420 | - |
| 4a.1.5.11 | Condensate Polishing - RCA | - | 183 | 4 | 15 | 348 | - | - | 101 | 651 | 651 | - | - | 2,078 | - | - | - | - | 84,395 | 2,329 | - |
| 4a.1.5.12 | Electro-hydraulic | - | 9 | - | - | - | - | - | 1 | 10 | - | - | 10 | - | - | - | - | - | - | 127 | - |
| 4a.1.5.13 | Feedwater | - | 153 | - | - | - | - | - | 23 | 175 | - | - | 175 | - | - | - | - | - | - | 2,215 | - |
| 4a.1.5.14 | Feedwater - RCA | - | 195 | 7 | 24 | 537 | - | - | 133 | 895 | 895 | - | - | 3,208 | - | - | - | - | 130,294 | 2,651 | - |
| 4a.1.5.15 | Gland Seal | - | 34 | - | - | - | - | - | 5 | 39 | - | - | 39 | - | - | - | - | - | - | 505 | - |
| 4a.1.5.16 | Heater Drain | - | 400 | - | - | - | - | - | 60 | 460 | - | - | 460 | - | - | - | - | - | - | 5,881 | - |
| 4a.1.5.17 | Internal Circ Water & CDSR | - | 27 | - | - | - | - | - | 4 | 31 | - | - | 31 | - | - | - | - | - | - | 389 | - |
| 4a.1.5.18 | Main Gen/Exciter/Transformer | - | 0 | - | - | - | - | - | 0 | 0 | - | - | 0 | - | - | - | - | - | - | 5 | - |
| 4a.1.5.19 | Main Steam | - | 115 | - | - | - | - | - | 17 | 133 | - | - | 133 | - | - | - | - | - | - | 1,690 | - |
| 4a.1.5.20 | Main Steam - RCA | - | 366 | 10 | 37 | 844 | - | - | 225 | 1,482 | 1,482 | - | - | 5,044 | - | - | - | - | 204,825 | 4,956 | - |
| 4a.1.5.21 | Steam Generator Blowdown | - | 434 | 22 | 29 | 340 | 234 | - | 224 | 1,282 | 1,282 | - | - | 2,031 | 686 | - | - | - | 126,640 | 5,974 | - |
| 4a.1.5.22 | Steam Generators | - | 5 | - | - | - | - | - | 1 | 6 | - | - | 6 | - | - | - | - | - | - | 75 | - |
| 4a.1.5.23 | Turbine & Moisture Separators | - | 386 | - | - | - | - | - | 58 | 444 | - | - | 444 | - | - | - | - | - | - | 5,609 | - |
| 4a.1.5.24 | Turbine Oil Purification | - | 70 | - | - | - | - | - | 11 | 81 | - | - | 81 | - | - | - | - | - | - | 1,003 | - |
| 4a.1.5 | Totals | - | 3,401 | 44 | 108 | 2,144 | 234 | - | 1,037 | 6,967 | 4,510 | - | - | 2,458 | 12,815 | 686 | - | - | 564,572 | 48,101 | - |
| 4a.1.6 | Scaffolding in support of decommissioning | - | 909 | 3 | 1 | 26 | 4 | - | 233 | 1,176 | 1,176 | - | - | 138 | 12 | - | - | - | 6,985 | 6,020 | - |
| 4a.1 | Subtotal Period 4a Activity Costs | 146 | 22,144 | 17,570 | 3,426 | 6,311 | 17,850 | 556 | 23,666 | 91,669 | 89,211 | - | 2,458 | 40,406 | 29,203 | - | 742 | - | 3,889,412 | 163,954 | 5,187 |
| Period 4a Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 4a.2.1 | Retired RPV upper internals package | - | 128 | 166 | 58 | - | 1,583 | - | 944 | 2,879 | 2,879 | - | - | - | 572 | 125 | - | - | 49,800 | 1,667 | 67 |
| 4a.2 | Subtotal Period 4a Additional Costs | - | 128 | 166 | 58 | - | 1,583 | - | 944 | 2,879 | 2,879 | - | - | - | 572 | 125 | - | - | 49,800 | 1,667 | 67 |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table J-1
Prairie Island SAFSTOR Unit 1
SAFSTOR Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| Period 4a Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 4a.3.1 | Process decommissioning water waste | 2 | - | 4 | 8 | - | 17 | - | 7 | 38 | 38 | - | - | - | 39 | - | - | - | 2,337 | 8 | - |
| 4a.3.3 | Small tool allowance | - | 213 | - | - | - | - | - | 32 | 245 | 220 | - | 24 | - | - | - | - | - | - | - | - |
| 4a.3.4 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 2,163 | 324 | 2,487 | - | 2,487 | - | - | - | - | - | - | - | - | - |
| 4a.3.5 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 1,660 | - | 1,660 | - | 1,660 | - | - | - | - | - | - | - | - | - |
| 4a.3 | Subtotal Period 4a Collateral Costs | 2 | 213 | 4 | 8 | - | 17 | 3,823 | 363 | 4,430 | 258 | 4,147 | 24 | - | 39 | - | - | - | 2,337 | 8 | - |
| Period 4a Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 4a.4.1 | Decon supplies | 100 | - | - | - | - | - | - | 25 | 125 | 125 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.2 | Insurance | - | - | - | - | - | - | 643 | 64 | 708 | 708 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.3 | Property taxes | - | - | - | - | - | - | 4,441 | 444 | 4,886 | 2,985 | 1,901 | - | - | - | - | - | - | - | - | - |
| 4a.4.4 | Health physics supplies | - | 1,744 | - | - | - | - | - | 436 | 2,181 | 2,181 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.5 | Heavy equipment rental | - | 3,325 | - | - | - | - | - | 499 | 3,824 | 3,824 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.6 | Disposal of DAW generated | - | - | 59 | 24 | - | 245 | - | 71 | 398 | 398 | - | - | - | 2,972 | - | - | - | 59,446 | 97 | - |
| 4a.4.7 | Plant energy budget | - | - | - | - | - | - | 2,047 | 307 | 2,354 | 2,354 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.8 | NRC ISFSI Fees | - | - | - | - | - | - | 55 | 6 | 61 | - | 61 | - | - | - | - | - | - | - | - | - |
| 4a.4.9 | NRC Fees | - | - | - | - | - | - | 643 | 64 | 707 | 707 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.10 | Emergency Planning Fees | - | - | - | - | - | - | 99 | 10 | 108 | - | 108 | - | - | - | - | - | - | - | - | - |
| 4a.4.11 | Fixed Overhead | - | - | - | - | - | - | 1,581 | 237 | 1,818 | 1,818 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.12 | Liquid Radwaste Processing Equipment/Services | - | - | - | - | - | - | 565 | 85 | 649 | 649 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.13 | ISFSI Operating Costs | - | - | - | - | - | - | 74 | 11 | 86 | - | 86 | - | - | - | - | - | - | - | - | - |
| 4a.4.14 | Railroad Track Maintenance | - | - | - | - | - | - | 83 | 12 | 96 | 96 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.15 | Remedial Actions Surveys | - | - | - | - | - | - | 1,489 | 223 | 1,712 | 1,712 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.16 | Security Staff Cost | - | - | - | - | - | - | 6,863 | 1,029 | 7,892 | 5,943 | 1,949 | - | - | - | - | - | - | - | - | 105,553 |
| 4a.4.17 | DOC Staff Cost | - | - | - | - | - | - | 17,190 | 2,579 | 19,769 | 19,769 | - | - | - | - | - | - | - | - | - | 189,964 |
| 4a.4.18 | Utility Staff Cost | - | - | - | - | - | - | 21,887 | 3,283 | 25,170 | 24,389 | 780 | - | - | - | - | - | - | - | - | 343,058 |
| 4a.4 | Subtotal Period 4a Period-Dependent Costs | 100 | 5,069 | 59 | 24 | - | 245 | 57,659 | 9,385 | 72,542 | 67,657 | 4,885 | - | - | 2,972 | - | - | - | 59,446 | 97 | 638,574 |
| 4a.0 | TOTAL PERIOD 4a COST | 248 | 27,554 | 17,799 | 3,516 | 6,311 | 19,695 | 62,038 | 34,358 | 171,520 | 160,006 | 9,032 | 2,482 | 40,406 | 32,786 | 125 | 742 | - | 4,000,995 | 165,725 | 643,828 |
| PERIOD 4b - Site Decontamination | | | | | | | | | | | | | | | | | | | | | |
| Period 4b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| 4b.1.1 | Remove spent fuel racks | 314 | 35 | 86 | 41 | - | 703 | - | 356 | 1,535 | 1,535 | - | - | - | 2,092 | - | - | - | 132,919 | 576 | - |
| Disposal of Plant Systems | | | | | | | | | | | | | | | | | | | | | |
| 4b.1.2.1 | Aux Bldg Normal Ventilation | - | 2 | 0 | 0 | 1 | - | - | 1 | 3 | 3 | - | - | 3 | - | - | - | - | 140 | 26 | - |
| 4b.1.2.3 | Buildings Maintenance | - | 5 | - | - | - | - | - | 1 | 5 | - | - | 5 | - | - | - | - | - | - | 65 | - |
| 4b.1.2.4 | Chemical & Volume Control | - | 1,263 | 89 | 90 | 753 | 973 | - | 694 | 3,861 | 3,861 | - | - | 4,498 | 2,846 | - | - | - | 366,565 | 17,235 | - |
| 4b.1.2.5 | Component Cooling - RCA | - | 858 | 25 | 91 | 2,079 | - | - | 543 | 3,597 | 3,597 | - | - | 12,427 | - | - | - | - | 504,675 | 11,242 | - |
| 4b.1.2.6 | Containment Cooling | - | 74 | - | - | - | - | - | 11 | 85 | - | - | 85 | - | - | - | - | - | - | 1,086 | - |
| 4b.1.2.7 | Containment Cooling - RCA | - | 304 | 7 | 25 | 569 | - | - | 166 | 1,070 | 1,070 | - | - | 3,400 | - | - | - | - | 138,090 | 3,971 | - |
| 4b.1.2.8 | Containment Hydrogen Control - RCA | - | 30 | 0 | 1 | 18 | - | - | 10 | 59 | 59 | - | - | 105 | - | - | - | - | 4,278 | 401 | - |
| 4b.1.2.9 | Containment Spray - RCA | - | 93 | 2 | 6 | 145 | - | - | 46 | 293 | 293 | - | - | 868 | - | - | - | - | 35,249 | 1,217 | - |
| 4b.1.2.10 | Containment Ventilation | - | 229 | 24 | 51 | 828 | 248 | - | 254 | 1,635 | 1,635 | - | - | 4,951 | 737 | - | - | - | 247,952 | 3,278 | - |
| 4b.1.2.11 | Cooling Water | - | 163 | - | - | - | - | - | 24 | 187 | - | - | 187 | - | - | - | - | - | - | 2,396 | - |
| 4b.1.2.12 | Cooling Water - RCA | - | 658 | 16 | 57 | 1,293 | - | - | 368 | 2,392 | 2,392 | - | - | 7,728 | - | - | - | - | 313,832 | 8,594 | - |
| 4b.1.2.13 | D1 Emergency Diesel | - | 50 | - | - | - | - | - | 8 | 58 | - | - | 58 | - | - | - | - | - | - | 730 | - |
| 4b.1.2.14 | D2 Emergency Diesel | - | 36 | - | - | - | - | - | 5 | 41 | - | - | 41 | - | - | - | - | - | - | 522 | - |
| 4b.1.2.15 | Diesel Rooms Ventilation | - | 9 | - | - | - | - | - | 1 | 11 | - | - | 11 | - | - | - | - | - | - | 135 | - |
| 4b.1.2.16 | Electrical - Clean | - | 1,905 | - | - | - | - | - | 286 | 2,191 | - | - | 2,191 | - | - | - | - | - | - | 26,981 | - |
| 4b.1.2.17 | Electrical - Contaminated | - | 553 | 7 | 20 | 423 | 32 | - | 213 | 1,248 | 1,248 | - | - | 2,527 | 95 | - | - | - | 108,690 | 7,488 | - |
| 4b.1.2.18 | Electrical - Contaminated - Fuel Pool | - | 137 | 2 | 5 | 103 | 8 | - | 53 | 307 | 307 | - | - | 615 | 23 | - | - | - | 26,449 | 1,857 | - |
| 4b.1.2.19 | Electrical - Decontaminated | - | 3,787 | 48 | 173 | 3,940 | - | - | 1,569 | 9,518 | 9,518 | - | - | 23,551 | - | - | - | - | 956,401 | 49,378 | - |
| 4b.1.2.20 | Electrical - Decontaminated - Fuel Pool | - | 947 | 12 | 43 | 986 | - | - | 392 | 2,380 | 2,380 | - | - | 5,893 | - | - | - | - | 239,327 | 12,340 | - |
| 4b.1.2.21 | Fuel Handling | - | 108 | 6 | 11 | 152 | 73 | - | 70 | 421 | 421 | - | - | 908 | 218 | - | - | - | 50,723 | 1,595 | - |
| 4b.1.2.22 | Fuel Oil | - | 121 | - | - | - | - | - | 18 | 140 | - | - | 140 | - | - | - | - | - | - | 1,697 | - |
| 4b.1.2.23 | HVAC - Clean | - | 120 | - | - | - | - | - | 18 | 138 | - | - | 138 | - | - | - | - | - | - | 1,891 | - |
| 4b.1.2.24 | HVAC - Contaminated | - | 337 | 9 | 26 | 546 | 41 | - | 181 | 1,141 | 1,141 | - | - | 3,261 | 123 | - | - | - | 140,257 | 4,335 | - |
| 4b.1.2.25 | HVAC - Contaminated - Fuel Pool | - | 145 | 4 | 11 | 234 | 18 | - | 78 | 489 | 489 | - | - | 1,398 | 53 | - | - | - | 60,110 | 1,858 | - |
| 4b.1.2.26 | Incore Instrumentation | - | 25 | 1 | 2 | 10 | 19 | - | 13 | 70 | 70 | - | - | 60 | 57 | - | - | - | 6,058 | 382 | - |
| 4b.1.2.27 | Misc Drains & Vents | - | 212 | 15 | 13 | 65 | 176 | - | 110 | 592 | 592 | - | - | 390 | 514 | - | - | - | 49,062 | 2,764 | - |
| 4b.1.2.28 | Reactor Coolant | - | 283 | 21 | 18 | 58 | 265 | - | 150 | 796 | 796 | - | - | 344 | 777 | - | - | - | 64,085 | 3,865 | - |
| 4b.1.2.29 | Reactor Hot Sampling | - | 125 | 12 | 7 | 11 | 118 | - | 65 | 339 | 339 | - | - | 66 | 342 | - | - | - | 25,063 | 1,611 | - |
| 4b.1.2.30 | Reactor Makeup | - | 73 | - | - | - | - | - | 11 | 84 | - | - | 84 | - | - | - | - | - | - | 1,042 | - |
| 4b.1.2.31 | Reactor Vessel | - | 19 | 1 | 0 | 4 | 5 | - | 7 | 36 | 36 | - | - | 26 | 14 | - | - | - | 2,000 | 260 | - |
| 4b.1.2.32 | Residual Heat Removal | - | 378 | 85 | 86 | 484 | 1,105 | - | 465 | 2,603 | 2,603 | - | - | 2,895 | 3,252 | - | - | - | 326,425 | 5,374 | - |
| 4b.1.2.33 | Safeguards Chilled Water | - | 18 | - | - | - | - | - | 3 | 20 | - | - | 20 | - | - | - | - | - | - | 259 | - |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table J-1
Prairie Island SAFSTOR Unit 1
SAFSTOR Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---------------------------------------|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| Disposal of Plant Systems (continued) | | | | | | | | | | | | | | | | | | | | | |
| 4b.1.2.34 | Safeguards Chilled Water - RCA | - | 85 | 1 | 4 | 83 | - | - | 34 | 207 | 207 | - | - | 495 | - | - | - | - | 20,100 | 1,019 | - |
| 4b.1.2.35 | Safety Injection | - | 809 | 42 | 73 | 1,136 | 393 | - | 486 | 2,939 | 2,939 | - | - | 6,788 | 1,156 | - | - | - | 349,908 | 11,276 | - |
| 4b.1.2.36 | Sampling | - | 54 | 4 | 3 | 10 | 37 | - | 25 | 133 | 133 | - | - | 59 | 107 | - | - | - | 9,420 | 731 | - |
| 4b.1.2.37 | Shield Bldg Ventilation | - | 125 | 14 | 26 | 360 | 165 | - | 132 | 821 | 821 | - | - | 2,152 | 491 | - | - | - | 118,583 | 1,811 | - |
| 4b.1.2.38 | Spent Fuel Pool Cooling | - | 324 | 34 | 32 | 135 | 450 | - | 222 | 1,198 | 1,198 | - | - | 806 | 1,325 | - | - | - | 117,816 | 4,400 | - |
| 4b.1.2.39 | Station & Instrument Air | - | 20 | - | - | - | - | - | 3 | 23 | - | - | 23 | - | - | - | - | - | - | 300 | - |
| 4b.1.2.40 | Station & Instrument Air - RCA | - | 81 | 1 | 2 | 56 | - | - | 29 | 169 | 169 | - | - | 332 | - | - | - | - | 13,496 | 1,053 | - |
| 4b.1.2.41 | Station & Instrument Air - RCA Fuel Pool | - | 20 | 0 | 1 | 14 | - | - | 7 | 42 | 42 | - | - | 83 | - | - | - | - | 3,374 | 263 | - |
| 4b.1.2.42 | Turbine Bldg Traps & Drains | - | 50 | - | - | - | - | - | 8 | 58 | - | - | 58 | - | - | - | - | - | - | 767 | - |
| 4b.1.2.43 | Unit Coolers | - | 42 | - | - | - | - | - | 6 | 49 | - | - | 49 | - | - | - | - | - | - | 611 | - |
| 4b.1.2.44 | Unit Coolers - RCA | - | 55 | 0 | 2 | 39 | - | - | 20 | 115 | 115 | - | - | 230 | - | - | - | - | 9,348 | 683 | - |
| 4b.1.2 | Totals | - | 14,735 | 481 | 883 | 14,533 | 4,126 | - | 6,807 | 41,565 | 38,474 | - | 3,091 | 86,861 | 12,129 | - | - | - | 4,307,475 | 198,796 | - |
| 4b.1.3 | Scaffolding in support of decommissioning | - | 1,363 | 4 | 2 | 38 | 6 | - | 349 | 1,763 | 1,763 | - | - | 207 | 18 | - | - | - | 10,477 | 9,030 | - |
| Decontamination of Site Buildings | | | | | | | | | | | | | | | | | | | | | |
| 4b.1.4.1 | Reactor | 1,096 | 2,527 | 240 | 1,236 | 373 | 7,080 | - | 3,215 | 15,766 | 15,766 | - | - | 2,230 | 67,325 | - | - | - | 3,286,372 | 45,729 | - |
| 4b.1.4.2 | Backwash Waste Receiving Tank | - | 25 | 3 | 17 | - | 97 | - | 33 | 175 | 175 | - | - | - | 929 | - | - | - | 43,896 | 266 | - |
| 4b.1.4 | Totals | 1,096 | 2,552 | 243 | 1,253 | 373 | 7,177 | - | 3,248 | 15,941 | 15,941 | - | - | 2,230 | 68,254 | - | - | - | 3,330,268 | 45,995 | - |
| 4b.1.5 | Prepare/submit License Termination Plan | - | - | - | - | - | - | 526 | 79 | 605 | 605 | - | - | - | - | - | - | - | - | - | 4,096 |
| 4b.1.6 | Receive NRC approval of termination plan | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 4b.1 | Subtotal Period 4b Activity Costs | 1,410 | 18,685 | 814 | 2,179 | 14,945 | 12,012 | 526 | 10,839 | 61,410 | 58,319 | - | 3,091 | 89,298 | 82,494 | - | - | - | 7,781,139 | 254,398 | 4,096 |
| Period 4b Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 4b.2.1 | License Termination Survey Planning | - | - | - | - | - | - | 1,037 | 311 | 1,348 | 1,348 | - | - | - | - | - | - | - | - | - | 6,240 |
| 4b.2.2 | Excavation of Underground Services | - | 1,175 | - | - | - | - | 225 | 328 | 1,728 | 1,728 | - | - | - | - | - | - | - | - | - | 7,411 |
| 4b.2.3 | Operational Equipment | - | - | 11 | 36 | 606 | - | - | 97 | 751 | 751 | - | - | 5,880 | - | - | - | - | 147,000 | 16 | - |
| 4b.2 | Subtotal Period 4b Additional Costs | - | 1,175 | 11 | 36 | 606 | - | 1,262 | 736 | 3,827 | 3,827 | - | - | 5,880 | - | - | - | - | 147,000 | 7,427 | 6,240 |
| Period 4b Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 4b.3.1 | Process decommissioning water waste | 5 | - | 9 | 16 | - | 37 | - | 15 | 83 | 83 | - | - | - | 85 | - | - | - | 5,092 | 17 | - |
| 4b.3.3 | Small tool allowance | - | 307 | - | - | - | - | - | 46 | 353 | 353 | - | - | - | - | - | - | - | - | - | - |
| 4b.3.4 | Decommissioning Equipment Disposition | - | - | 130 | 67 | 1,112 | 178 | - | 234 | 1,722 | 1,722 | - | - | 6,000 | 529 | - | - | - | 303,608 | 147 | - |
| 4b.3.5 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 2,225 | - | 2,225 | - | 2,225 | - | - | - | - | - | - | - | - | - |
| 4b.3 | Subtotal Period 4b Collateral Costs | 5 | 307 | 139 | 84 | 1,112 | 215 | 2,225 | 296 | 4,382 | 2,158 | 2,225 | - | 6,000 | 614 | - | - | - | 308,700 | 163 | - |
| Period 4b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 4b.4.1 | Decon supplies | 564 | - | - | - | - | - | - | 141 | 705 | 705 | - | - | - | - | - | - | - | - | - | - |
| 4b.4.2 | Insurance | - | - | - | - | - | - | 862 | 86 | 949 | 949 | - | - | - | - | - | - | - | - | - | - |
| 4b.4.3 | Property taxes | - | - | - | - | - | - | 5,819 | 582 | 6,401 | 3,853 | 2,548 | - | - | - | - | - | - | - | - | - |
| 4b.4.4 | Health physics supplies | - | 2,435 | - | - | - | - | - | 609 | 3,043 | 3,043 | - | - | - | - | - | - | - | - | - | - |
| 4b.4.5 | Heavy equipment rental | - | 4,577 | - | - | - | - | - | 687 | 5,263 | 5,263 | - | - | - | - | - | - | - | - | - | - |
| 4b.4.6 | Disposal of DAW generated | - | - | 77 | 31 | - | 322 | - | 93 | 523 | 523 | - | - | - | 3,905 | - | - | - | 78,097 | 127 | - |
| 4b.4.7 | Plant energy budget | - | - | - | - | - | - | 2,165 | 325 | 2,490 | 2,490 | - | - | - | - | - | - | - | - | - | - |
| 4b.4.8 | NRC ISFSI Fees | - | - | - | - | - | - | 74 | 7 | 81 | - | 81 | - | - | - | - | - | - | - | - | - |
| 4b.4.9 | NRC Fees | - | - | - | - | - | - | 862 | 86 | 948 | 948 | - | - | - | - | - | - | - | - | - | - |
| 4b.4.10 | Emergency Planning Fees | - | - | - | - | - | - | 132 | 13 | 145 | - | 145 | - | - | - | - | - | - | - | - | - |
| 4b.4.11 | Fixed Overhead | - | - | - | - | - | - | 2,118 | 318 | 2,436 | 2,436 | - | - | - | - | - | - | - | - | - | - |
| 4b.4.12 | Liquid Radwaste Processing Equipment/Services | - | - | - | - | - | - | 757 | 113 | 870 | 870 | - | - | - | - | - | - | - | - | - | - |
| 4b.4.13 | ISFSI Operating Costs | - | - | - | - | - | - | 100 | 15 | 115 | - | 115 | - | - | - | - | - | - | - | - | - |
| 4b.4.14 | Railroad Track Maintenance | - | - | - | - | - | - | 111 | 17 | 128 | 128 | - | - | - | - | - | - | - | - | - | - |
| 4b.4.15 | Remedial Actions Surveys | - | - | - | - | - | - | 1,995 | 299 | 2,294 | 2,294 | - | - | - | - | - | - | - | - | - | - |
| 4b.4.16 | Security Staff Cost | - | - | - | - | - | - | 1,202 | 180 | 1,383 | 462 | 921 | - | - | - | - | - | - | - | - | 20,373 |
| 4b.4.17 | DOC Staff Cost | - | - | - | - | - | - | 15,039 | 2,256 | 17,294 | 17,294 | - | - | - | - | - | - | - | - | - | 174,093 |
| 4b.4.18 | Utility Staff Cost | - | - | - | - | - | - | 18,793 | 2,819 | 21,612 | 20,790 | 821 | - | - | - | - | - | - | - | - | 311,145 |
| 4b.4 | Subtotal Period 4b Period-Dependent Costs | 564 | 7,011 | 77 | 31 | - | 322 | 50,029 | 8,646 | 66,682 | 62,051 | 4,631 | - | - | 3,905 | - | - | - | 78,097 | 127 | 505,611 |
| 4b.0 | TOTAL PERIOD 4b COST | 1,979 | 27,178 | 1,042 | 2,330 | 16,663 | 12,549 | 54,043 | 20,517 | 136,300 | 126,354 | 6,856 | 3,091 | 101,178 | 87,013 | - | - | - | 8,314,936 | 262,116 | 515,947 |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table J-1
Prairie Island SAFSTOR Unit 1
SAFSTOR Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|---|--------------|---------------|-----------------|-----------------|---------------------------|---------------------|----------------|-------------------|----------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| PERIOD 4e - Delay before License Termination | | | | | | | | | | | | | | | | | | | | | |
| Period 4e Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| Period 4e Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 4e.3.1 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 986 | - | 986 | - | 986 | - | - | - | - | - | - | - | - | - |
| 4e.3 | Subtotal Period 4e Collateral Costs | - | - | - | - | - | - | 986 | - | 986 | - | 986 | - | - | - | - | - | - | - | - | - |
| Period 4e Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 4e.4.1 | Insurance | - | - | - | - | - | - | 382 | 38 | 420 | - | 420 | - | - | - | - | - | - | - | - | - |
| 4e.4.2 | Property taxes | - | - | - | - | - | - | 2,498 | 250 | 2,748 | 1,624 | 1,124 | - | - | - | - | - | - | - | - | - |
| 4e.4.3 | Health physics supplies | - | 87 | - | - | - | - | - | 22 | 109 | 109 | - | - | - | - | - | - | - | - | - | - |
| 4e.4.4 | Disposal of DAW generated | - | - | 2 | 1 | - | 6 | - | 2 | 11 | 11 | - | - | 79 | - | - | - | - | 1,573 | 3 | - |
| 4e.4.6 | NRC ISFSI Fees | - | - | - | - | - | - | 33 | 3 | 36 | - | 36 | - | - | - | - | - | - | - | - | - |
| 4e.4.7 | NRC Fees | - | - | - | - | - | - | 162 | 16 | 178 | 178 | - | - | - | - | - | - | - | - | - | - |
| 4e.4.8 | Emergency Planning Fees | - | - | - | - | - | - | 58 | 6 | 64 | - | 64 | - | - | - | - | - | - | - | - | - |
| 4e.4.9 | Fixed Overhead | - | - | - | - | - | - | 939 | 141 | 1,079 | 1,079 | - | - | - | - | - | - | - | - | - | - |
| 4e.4.10 | ISFSI Operating Costs | - | - | - | - | - | - | 44 | 7 | 51 | - | 51 | - | - | - | - | - | - | - | - | - |
| 4e.4.11 | Railroad Track Maintenance | - | - | - | - | - | - | 49 | 7 | 57 | 57 | - | - | - | - | - | - | - | - | - | - |
| 4e.4.12 | Utility Staff Cost | - | - | - | - | - | - | 696 | 104 | 801 | 742 | 58 | - | - | - | - | - | - | - | - | 11,488 |
| 4e.4 | Subtotal Period 4e Period-Dependent Costs | - | 87 | 2 | 1 | - | 6 | 4,862 | 596 | 5,554 | 3,800 | 1,754 | - | - | 79 | - | - | - | 1,573 | 3 | 11,488 |
| 4e.0 | TOTAL PERIOD 4e COST | - | 87 | 2 | 1 | - | 6 | 5,847 | 596 | 6,540 | 3,800 | 2,740 | - | - | 79 | - | - | - | 1,573 | 3 | 11,488 |
| PERIOD 4f - License Termination | | | | | | | | | | | | | | | | | | | | | |
| Period 4f Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| 4f.1.1 | ORISE confirmatory survey | - | - | - | - | - | - | 166 | 50 | 216 | 216 | - | - | - | - | - | - | - | - | - | - |
| 4f.1.2 | Terminate license | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 4f.1 | Subtotal Period 4f Activity Costs | - | - | - | - | - | - | 166 | 50 | 216 | 216 | - | - | - | - | - | - | - | - | - | - |
| Period 4f Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 4f.2.1 | License Termination Survey | - | - | - | - | - | - | 3,199 | 960 | 4,159 | 4,159 | - | - | - | - | - | - | - | - | 40,531 | 3,120 |
| 4f.2 | Subtotal Period 4f Additional Costs | - | - | - | - | - | - | 3,199 | 960 | 4,159 | 4,159 | - | - | - | - | - | - | - | - | 40,531 | 3,120 |
| Period 4f Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 4f.3.1 | DOC staff relocation expenses | - | - | - | - | - | - | 1,264 | 190 | 1,454 | 1,454 | - | - | - | - | - | - | - | - | - | - |
| 4f.3.2 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 934 | - | 934 | - | 934 | - | - | - | - | - | - | - | - | - |
| 4f.3 | Subtotal Period 4f Collateral Costs | - | - | - | - | - | - | 2,198 | 190 | 2,388 | 1,454 | 934 | - | - | - | - | - | - | - | - | - |
| Period 4f Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 4f.4.1 | Insurance | - | - | - | - | - | - | 362 | 36 | 398 | - | 398 | - | - | - | - | - | - | - | - | - |
| 4f.4.2 | Property taxes | - | - | - | - | - | - | 2,306 | 231 | 2,537 | 1,469 | 1,068 | - | - | - | - | - | - | - | - | - |
| 4f.4.3 | Health physics supplies | - | 501 | - | - | - | - | - | 125 | 626 | 626 | - | - | - | - | - | - | - | - | - | - |
| 4f.4.4 | Disposal of DAW generated | - | - | 7 | 3 | - | 28 | - | 8 | 45 | 45 | - | - | 334 | - | - | - | - | 6,685 | 11 | - |
| 4f.4.5 | Plant energy budget | - | - | - | - | - | - | 243 | 36 | 279 | 279 | - | - | - | - | - | - | - | - | - | - |
| 4f.4.6 | NRC ISFSI Fees | - | - | - | - | - | - | 31 | 3 | 34 | - | 34 | - | - | - | - | - | - | - | - | - |
| 4f.4.7 | NRC Fees | - | - | - | - | - | - | 422 | 42 | 465 | 465 | - | - | - | - | - | - | - | - | - | - |
| 4f.4.8 | Emergency Planning Fees | - | - | - | - | - | - | 55 | 6 | 61 | - | 61 | - | - | - | - | - | - | - | - | - |
| 4f.4.9 | Fixed Overhead | - | - | - | - | - | - | 890 | 133 | 1,023 | 1,023 | - | - | - | - | - | - | - | - | - | - |
| 4f.4.10 | ISFSI Operating Costs | - | - | - | - | - | - | 42 | 6 | 48 | - | 48 | - | - | - | - | - | - | - | - | - |
| 4f.4.11 | Railroad Track Maintenance | - | - | - | - | - | - | 47 | 7 | 54 | 54 | - | - | - | - | - | - | - | - | - | - |
| 4f.4.12 | Security Staff Cost | - | - | - | - | - | - | 1,835 | 275 | 2,111 | 927 | 1,184 | - | - | - | - | - | - | - | - | 27,614 |
| 4f.4.13 | DOC Staff Cost | - | - | - | - | - | - | 4,238 | 636 | 4,874 | 4,874 | - | - | - | - | - | - | - | - | - | 46,283 |
| 4f.4.14 | Utility Staff Cost | - | - | - | - | - | - | 4,011 | 602 | 4,613 | 4,175 | 438 | - | - | - | - | - | - | - | - | 59,507 |
| 4f.4 | Subtotal Period 4f Period-Dependent Costs | - | 501 | 7 | 3 | - | 28 | 14,483 | 2,147 | 17,167 | 13,936 | 3,232 | - | - | 334 | - | - | - | 6,685 | 11 | 133,404 |
| 4f.0 | TOTAL PERIOD 4f COST | - | 501 | 7 | 3 | - | 28 | 20,046 | 3,346 | 23,930 | 19,764 | 4,166 | - | - | 334 | - | - | - | 6,685 | 40,542 | 136,524 |
| PERIOD 4 TOTALS | | 2,227 | 55,320 | 18,849 | 5,850 | 22,974 | 32,278 | 141,974 | 58,818 | 338,289 | 309,924 | 22,793 | 5,573 | 141,584 | 120,212 | 125 | 742 | - | 12,324,190 | 468,386 | 1,307,787 |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table J-1
Prairie Island SAFSTOR Unit 1
SAFSTOR Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|---------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| PERIOD 5b - Site Restoration | | | | | | | | | | | | | | | | | | | | | | |
| Period 5b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Demolition of Remaining Site Buildings | | | | | | | | | | | | | | | | | | | | | | |
| 5b.1.1.1 | Reactor | - | 4,644 | - | - | - | - | - | 697 | 5,341 | - | - | 5,341 | - | - | - | - | - | - | - | 44,669 | - |
| 5b.1.1.2 | Condensate Storage Tank Foundation | - | 3 | - | - | - | - | - | 0 | 4 | - | - | 4 | - | - | - | - | - | - | - | 16 | - |
| 5b.1.1.3 | Structures below 3' below grade | - | 1,785 | - | - | - | - | - | 268 | 2,052 | - | - | 2,052 | - | - | - | - | - | - | - | 9,238 | - |
| 5b.1.1.4 | Turbine | - | 2,139 | - | - | - | - | - | 321 | 2,460 | - | - | 2,460 | - | - | - | - | - | - | - | 21,985 | - |
| 5b.1.1.5 | Turbine Pedestal | - | 365 | - | - | - | - | - | 55 | 420 | - | - | 420 | - | - | - | - | - | - | - | 1,857 | - |
| 5b.1.1 | Totals | - | 8,936 | - | - | - | - | - | 1,340 | 10,276 | - | - | 10,276 | - | - | - | - | - | - | - | 77,765 | - |
| Site Closeout Activities | | | | | | | | | | | | | | | | | | | | | | |
| 5b.1.2 | Grade & landscape site | - | 448 | - | - | - | - | - | 67 | 515 | - | - | 515 | - | - | - | - | - | - | - | 921 | - |
| 5b.1.3 | Final report to NRC | - | - | - | - | - | - | 200 | 30 | 231 | 231 | - | - | - | - | - | - | - | - | - | - | 1,560 |
| 5b.1 | Subtotal Period 5b Activity Costs | - | 9,384 | - | - | - | - | 200 | 1,438 | 11,022 | 231 | - | 10,792 | - | - | - | - | - | - | - | 78,686 | 1,560 |
| Period 5b Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 5b.2.1 | Clean Concrete Disposal | - | 2,242 | - | - | - | - | 5 | 337 | 2,583 | - | - | 2,583 | - | - | - | - | - | - | - | 8,386 | - |
| 5b.2.2 | Intake Structure Cofferdam | - | 623 | - | - | - | - | - | 93 | 716 | - | - | 716 | - | - | - | - | - | - | - | 5,168 | - |
| 5b.2.3 | Construction Debris | - | - | - | - | - | - | 10 | 2 | 12 | - | - | 12 | - | - | - | - | - | - | - | - | - |
| 5b.2.4 | Backfill | - | 3,011 | - | - | - | - | - | 452 | 3,462 | - | - | 3,462 | - | - | - | - | - | - | - | 2,904 | - |
| 5b.2.5 | Disposition of Original Casks | - | 24 | 80 | 418 | - | 2,390 | - | 728 | 3,640 | 3,640 | - | - | - | - | 8,929 | - | - | - | 1,059,612 | 146 | - |
| 5b.2 | Subtotal Period 5b Additional Costs | - | 5,899 | 80 | 418 | - | 2,390 | 15 | 1,611 | 10,413 | 3,640 | - | 6,773 | - | - | 8,929 | - | - | - | 1,059,612 | 16,604 | - |
| Period 5b Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 5b.3.1 | Small tool allowance | - | 122 | - | - | - | - | - | 18 | 140 | - | - | 140 | - | - | - | - | - | - | - | - | - |
| 5b.3.2 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 3,821 | 573 | 4,394 | - | 4,394 | - | - | - | - | - | - | - | - | - | - |
| 5b.3.3 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 2,649 | - | 2,649 | - | 2,649 | - | - | - | - | - | - | - | - | - | - |
| 5b.3 | Subtotal Period 5b Collateral Costs | - | 122 | - | - | - | - | 6,470 | 591 | 7,183 | - | 7,043 | 140 | - | - | - | - | - | - | - | - | - |
| Period 5b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 5b.4.1 | Insurance | - | - | - | - | - | - | 513 | 51 | 565 | - | 565 | - | - | - | - | - | - | - | - | - | - |
| 5b.4.2 | Property taxes | - | - | - | - | - | - | 5,904 | 590 | 6,494 | - | 2,663 | 3,831 | - | - | - | - | - | - | - | - | - |
| 5b.4.3 | Heavy equipment rental | - | 7,144 | - | - | - | - | - | 1,072 | 8,215 | - | - | 8,215 | - | - | - | - | - | - | - | - | - |
| 5b.4.4 | Plant energy budget | - | - | - | - | - | - | 344 | 52 | 395 | - | 395 | - | - | - | - | - | - | - | - | - | - |
| 5b.4.5 | NRC ISFSI Fees | - | - | - | - | - | - | 243 | 24 | 268 | - | 268 | - | - | - | - | - | - | - | - | - | - |
| 5b.4.6 | Emergency Planning Fees | - | - | - | - | - | - | 157 | 16 | 173 | - | 173 | - | - | - | - | - | - | - | - | - | - |
| 5b.4.7 | Fixed Overhead | - | - | - | - | - | - | 1,024 | 154 | 1,178 | - | 781 | 397 | - | - | - | - | - | - | - | - | - |
| 5b.4.8 | ISFSI Operating Costs | - | - | - | - | - | - | 119 | 18 | 136 | - | 136 | - | - | - | - | - | - | - | - | - | - |
| 5b.4.9 | Railroad Track Maintenance | - | - | - | - | - | - | 133 | 20 | 152 | (0) | 97 | 56 | - | - | - | - | - | - | - | - | - |
| 5b.4.10 | Security Staff Cost | - | - | - | - | - | - | 4,976 | 746 | 5,722 | 0 | 5,310 | 412 | - | - | - | - | - | - | - | - | 74,431 |
| 5b.4.11 | DOC Staff Cost | - | - | - | - | - | - | 10,921 | 1,638 | 12,559 | - | - | 12,559 | - | - | - | - | - | - | - | - | 116,885 |
| 5b.4.12 | Utility Staff Cost | - | - | - | - | - | - | 5,170 | 776 | 5,946 | - | 1,278 | 4,668 | - | - | - | - | - | - | - | - | 76,637 |
| 5b.4 | Subtotal Period 5b Period-Dependent Costs | - | 7,144 | - | - | - | - | 29,504 | 5,156 | 41,804 | 0 | 11,666 | 30,139 | - | - | - | - | - | - | - | - | 267,952 |
| 5b.0 | TOTAL PERIOD 5b COST | - | 22,548 | 80 | 418 | - | 2,390 | 36,189 | 8,797 | 70,422 | 3,871 | 18,708 | 47,843 | - | - | 8,929 | - | - | - | 1,059,612 | 95,290 | 269,512 |
| PERIOD 5c - Fuel Storage Operations/Shipping | | | | | | | | | | | | | | | | | | | | | | |
| Period 5c Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Period 5c Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 5c.3.1 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 445,840 | 66,876 | 512,716 | - | 512,716 | - | - | - | - | - | - | - | - | - | - |
| 5c.3.2 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 152,793 | - | 152,793 | - | 152,793 | - | - | - | - | - | - | - | - | - | - |
| 5c.3 | Subtotal Period 5c Collateral Costs | - | - | - | - | - | - | 598,632 | 66,876 | 665,508 | - | 665,508 | - | - | - | - | - | - | - | - | - | - |
| Period 5c Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 5c.4.1 | Insurance | - | - | - | - | - | - | 29,616 | 2,962 | 32,578 | - | 32,578 | - | - | - | - | - | - | - | - | - | - |
| 5c.4.2 | Property taxes | - | - | - | - | - | - | 169,412 | 16,941 | 186,354 | - | 186,354 | - | - | - | - | - | - | - | - | - | - |
| 5c.4.3 | Plant energy budget | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 5c.4.4 | NRC ISFSI Fees | - | - | - | - | - | - | 14,030 | 1,403 | 15,432 | - | 15,432 | - | - | - | - | - | - | - | - | - | - |
| 5c.4.5 | Emergency Planning Fees | - | - | - | - | - | - | 9,068 | 907 | 9,974 | - | 9,974 | - | - | - | - | - | - | - | - | - | - |
| 5c.4.6 | Fixed Overhead | - | - | - | - | - | - | 19,930 | 2,990 | 22,920 | - | 22,920 | - | - | - | - | - | - | - | - | - | - |
| 5c.4.7 | ISFSI Operating Costs | - | - | - | - | - | - | 6,845 | 1,027 | 7,872 | - | 7,872 | - | - | - | - | - | - | - | - | - | - |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table J-1
Prairie Island SAFSTOR Unit 1
SAFSTOR Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|--|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| Period 5c Period-Dependent Costs (continued) | | | | | | | | | | | | | | | | | | | | | |
| 5c.4.8 | Railroad Track Maintenance | - | - | - | - | - | - | 7,647 | 1,147 | 8,795 | - | 8,795 | - | - | - | - | - | - | - | - | - |
| 5c.4.9 | Security Staff Cost | - | - | - | - | - | - | 236,347 | 35,452 | 271,799 | - | 271,799 | - | - | - | - | - | - | - | - | 3,434,684 |
| 5c.4.10 | DOC Staff Cost | - | - | - | - | - | - | 18,749 | 2,812 | 21,561 | - | 21,561 | - | - | - | - | - | - | - | - | 127,211 |
| 5c.4.11 | Utility Staff Cost | - | - | - | - | - | - | 115,440 | 17,316 | 132,756 | - | 132,756 | - | - | - | - | - | - | - | - | 1,685,540 |
| 5c.4 | Subtotal Period 5c Period-Dependent Costs | - | - | - | - | - | - | 627,085 | 82,956 | 710,041 | - | 710,041 | - | - | - | - | - | - | - | - | 5,247,434 |
| 5c.0 | TOTAL PERIOD 5c COST | - | - | - | - | - | - | 1,225,717 | 149,832 | 1,375,549 | - | 1,375,549 | - | - | - | - | - | - | - | - | 5,247,434 |
| PERIOD 5d - GTCC shipping | | | | | | | | | | | | | | | | | | | | | |
| Period 5d Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| Nuclear Steam Supply System Removal | | | | | | | | | | | | | | | | | | | | | |
| 5d.1.1.1 | Vessel & Internals GTCC Disposal | - | - | 1,444 | - | - | 8,680 | - | 1,663 | 11,787 | 11,787 | - | - | - | - | - | - | 1,773 | 344,823 | - | - |
| 5d.1.1 | Totals | - | - | 1,444 | - | - | 8,680 | - | 1,663 | 11,787 | 11,787 | - | - | - | - | - | - | 1,773 | 344,823 | - | - |
| 5d.1 | Subtotal Period 5d Activity Costs | - | - | 1,444 | - | - | 8,680 | - | 1,663 | 11,787 | 11,787 | - | - | - | - | - | - | 1,773 | 344,823 | - | - |
| Period 5d Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 5d.3.1 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 28 | 4 | 32 | - | 32 | - | - | - | - | - | - | - | - | - |
| 5d.3.2 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 48 | - | 48 | - | 48 | - | - | - | - | - | - | - | - | - |
| 5d.3 | Subtotal Period 5d Collateral Costs | - | - | - | - | - | - | 76 | 4 | 80 | - | 80 | - | - | - | - | - | - | - | - | - |
| Period 5d Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 5d.4.1 | Insurance | - | - | - | - | - | - | 9 | 1 | 10 | 10 | - | - | - | - | - | - | - | - | - | - |
| 5d.4.2 | Property taxes | - | - | - | - | - | - | 53 | 5 | 58 | 58 | - | - | - | - | - | - | - | - | - | - |
| 5d.4.4 | NRC ISFSI Fees | - | - | - | - | - | - | 4 | 0 | 4 | - | 4 | - | - | - | - | - | - | - | - | - |
| 5d.4.5 | Emergency Planning Fees | - | - | - | - | - | - | 3 | 0 | 3 | - | 3 | - | - | - | - | - | - | - | - | - |
| 5d.4.6 | Fixed Overhead | - | - | - | - | - | - | 6 | 1 | 7 | 7 | - | - | - | - | - | - | - | - | - | - |
| 5d.4.7 | Railroad Track Maintenance | - | - | - | - | - | - | 2 | 0 | 3 | 3 | - | - | - | - | - | - | - | - | - | - |
| 5d.4.8 | Security Staff Cost | - | - | - | - | - | - | 74 | 11 | 85 | 85 | - | - | - | - | - | - | - | - | - | 1,077 |
| 5d.4.9 | Utility Staff Cost | - | - | - | - | - | - | 19 | 3 | 22 | 22 | - | - | - | - | - | - | - | - | - | 269 |
| 5d.4 | Subtotal Period 5d Period-Dependent Costs | - | - | - | - | - | - | 171 | 22 | 194 | 186 | 7 | - | - | - | - | - | - | - | - | 1,346 |
| 5d.0 | TOTAL PERIOD 5d COST | - | - | 1,444 | - | - | 8,680 | 247 | 1,689 | 12,060 | 11,973 | 87 | - | - | - | - | - | 1,773 | 344,823 | - | 1,346 |
| PERIOD 5e - ISFSI Decontamination | | | | | | | | | | | | | | | | | | | | | |
| Period 5e Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| Period 5e Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 5e.2.1 | License Termination ISFSI | - | 0 | 2 | 17 | - | 142 | 1,197 | 339 | 1,696 | 1,696 | - | - | - | 424 | - | - | - | 65,754 | 5,882 | 1,161 |
| 5e.2 | Subtotal Period 5e Additional Costs | - | 0 | 2 | 17 | - | 142 | 1,197 | 339 | 1,696 | 1,696 | - | - | - | 424 | - | - | - | 65,754 | 5,882 | 1,161 |
| Period 5e Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 5e.4.1 | Insurance | - | - | - | - | - | - | 93 | 23 | 116 | 116 | - | - | - | - | - | - | - | - | - | - |
| 5e.4.2 | Property taxes | - | - | - | - | - | - | 56 | 14 | 69 | 69 | - | - | - | - | - | - | - | - | - | - |
| 5e.4.3 | Plant energy budget | - | - | - | - | - | - | 11 | 3 | 13 | 13 | - | - | - | - | - | - | - | - | - | - |
| 5e.4.4 | Fixed Overhead | - | - | - | - | - | - | 54 | 14 | 68 | 68 | - | - | - | - | - | - | - | - | - | - |
| 5e.4.5 | Railroad Track Maintenance | - | - | - | - | - | - | 21 | 5 | 26 | 26 | - | - | - | - | - | - | - | - | - | - |
| 5e.4.6 | Security Staff Cost | - | - | - | - | - | - | 174 | 43 | 217 | 217 | - | - | - | - | - | - | - | - | - | 2,500 |
| 5e.4.7 | Utility Staff Cost | - | - | - | - | - | - | 129 | 32 | 161 | 161 | - | - | - | - | - | - | - | - | - | 1,896 |
| 5e.4 | Subtotal Period 5e Period-Dependent Costs | - | - | - | - | - | - | 536 | 134 | 670 | 670 | - | - | - | - | - | - | - | - | - | 4,396 |
| 5e.0 | TOTAL PERIOD 5e COST | - | 0 | 2 | 17 | - | 142 | 1,733 | 473 | 2,367 | 2,367 | - | - | - | 424 | - | - | - | 65,754 | 5,882 | 5,556 |
| PERIOD 5f - ISFSI Site Restoration | | | | | | | | | | | | | | | | | | | | | |
| Period 5f Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| Period 5f Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 5f.2.1 | Demolition and Site Restoration of ISFSI | - | 1,121 | - | - | - | - | 161 | 192 | 1,474 | - | - | 1,474 | - | - | - | - | - | - | 4,846 | 80 |
| 5f.2 | Subtotal Period 5f Additional Costs | - | 1,121 | - | - | - | - | 161 | 192 | 1,474 | - | - | 1,474 | - | - | - | - | - | - | 4,846 | 80 |

**Prairie Island Nuclear Generating Plant
 Decommissioning Cost Analysis**

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**Table J-1
 Prairie Island SAFSTOR Unit 1
 SAFSTOR Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
 (Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|-----------------------------------|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|-------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| Period 5f Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 5F.3.1 | Small tool allowance | - | 7 | - | - | - | - | - | 1 | 8 | - | - | 8 | - | - | - | - | - | - | - | - | - |
| 5F.3 | Subtotal Period 5f Collateral Costs | - | 7 | - | - | - | - | - | 1 | 8 | - | - | 8 | - | - | - | - | - | - | - | - | - |
| Period 5f Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 5F.4.2 | Property taxes | - | - | - | - | - | - | 28 | 3 | 31 | - | - | 31 | - | - | - | - | - | - | - | - | - |
| 5F.4.3 | Heavy equipment rental | - | 59 | - | - | - | - | - | 9 | 68 | - | - | 68 | - | - | - | - | - | - | - | - | - |
| 5F.4.4 | Plant energy budget | - | - | - | - | - | - | 6 | 1 | 6 | - | - | 6 | - | - | - | - | - | - | - | - | - |
| 5F.4.5 | Fixed Overhead | - | - | - | - | - | - | 28 | 4 | 32 | - | - | 32 | - | - | - | - | - | - | - | - | - |
| 5F.4.6 | Railroad Track Maintenance | - | - | - | - | - | - | 11 | 2 | 12 | - | - | 12 | - | - | - | - | - | - | - | - | - |
| 5F.4.7 | Security Staff Cost | - | - | - | - | - | - | 89 | 13 | 102 | - | - | 102 | - | - | - | - | - | - | - | - | 1,281 |
| 5F.4.8 | Utility Staff Cost | - | - | - | - | - | - | 55 | 8 | 63 | - | - | 63 | - | - | - | - | - | - | - | - | 795 |
| 5F.4 | Subtotal Period 5f Period-Dependent Costs | - | 59 | - | - | - | - | 216 | 40 | 315 | - | - | 315 | - | - | - | - | - | - | - | - | 2,076 |
| 5F.0 | TOTAL PERIOD 5f COST | - | 1,187 | - | - | - | - | 377 | 233 | 1,798 | - | - | 1,798 | - | - | - | - | - | - | - | 4,846 | 2,156 |
| PERIOD 5 TOTALS | | - | 23,736 | 1,525 | 435 | - | 11,212 | 1,264,263 | 161,025 | 1,462,196 | 18,210 | 1,394,345 | 49,641 | - | 9,353 | - | - | 1,773 | 1,470,189 | 106,017 | 5,526,005 | |
| TOTAL COST TO DECOMMISSION | | 6,192 | 94,084 | 20,994 | 6,793 | 23,152 | 45,944 | 2,416,286 | 354,811 | 2,968,256 | 963,420 | 1,947,995 | 56,842 | 147,716 | 151,089 | 125 | 742 | 1,773 | 14,528,860 | 652,634 | 11,679,960 | |

| | | |
|--|--------------------|----------------------------------|
| TOTAL COST TO DECOMMISSION WITH 13.58% CONTINGENCY: | \$2,968,256 | thousands of 2020 dollars |
| TOTAL NRC LICENSE TERMINATION COST IS 32.46% OR: | \$963,420 | thousands of 2020 dollars |
| SPENT FUEL MANAGEMENT COST IS 65.63% OR: | \$1,947,995 | thousands of 2020 dollars |
| NON-NUCLEAR DEMOLITION COST IS 1.91% OR: | \$56,842 | thousands of 2020 dollars |
| TOTAL LOW-LEVEL RADIOACTIVE WASTE VOLUME BURIED (EXCLUDING GTCC): | 151,957 | Cubic Feet |
| TOTAL GREATER THAN CLASS C RADWASTE VOLUME GENERATED: | 1,773 | Cubic Feet |
| TOTAL SCRAP METAL REMOVED: | 33,003 | Tons |
| TOTAL CRAFT LABOR REQUIREMENTS: | 652,634 | Man-hours |

End Notes:
 n/a - indicates that this activity not charged as decommissioning expense
 a - indicates that this activity performed by decommissioning staff
 0 - indicates that this value is less than 0.5 but is non-zero
 A cell containing " - " indicates a zero value

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table J-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|--|--|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| PERIOD 1a - Shutdown through Transition | | | | | | | | | | | | | | | | | | | | | |
| Period 1a Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| 1a.1.1 | SAFSTOR site characterization survey | - | - | - | - | - | - | 415 | 124 | 539 | 539 | - | - | - | - | - | - | - | - | - | - |
| 1a.1.2 | Prepare preliminary decommissioning cost | - | - | - | - | - | - | 71 | 11 | 82 | 82 | - | - | - | - | - | - | - | - | - | 556 |
| 1a.1.3 | Notification of Cessation of Operations | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.4 | Remove fuel & source material | - | - | - | - | - | - | - | - | n/a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.5 | Notification of Permanent Defueling | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.6 | Deactivate plant systems & process waste | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.7 | Prepare and submit PSDAR | - | - | - | - | - | - | 110 | 16 | 126 | 126 | - | - | - | - | - | - | - | - | - | 855 |
| 1a.1.8 | Review plant dwgs & specs. | - | - | - | - | - | - | 71 | 11 | 82 | 82 | - | - | - | - | - | - | - | - | - | 556 |
| 1a.1.9 | Perform detailed rad survey | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.10 | Estimate by-product inventory | - | - | - | - | - | - | 55 | 8 | 63 | 63 | - | - | - | - | - | - | - | - | - | 428 |
| 1a.1.11 | End product description | - | - | - | - | - | - | 55 | 8 | 63 | 63 | - | - | - | - | - | - | - | - | - | 428 |
| 1a.1.12 | Detailed by-product inventory | - | - | - | - | - | - | 82 | 12 | 95 | 95 | - | - | - | - | - | - | - | - | - | 641 |
| 1a.1.13 | Define major work sequence | - | - | - | - | - | - | 55 | 8 | 63 | 63 | - | - | - | - | - | - | - | - | - | 428 |
| 1a.1.14 | Perform SER and EA | - | - | - | - | - | - | 170 | 26 | 196 | 196 | - | - | - | - | - | - | - | - | - | 1,326 |
| 1a.1.15 | Prepare/submit Defueled Technical Specifications | - | - | - | - | - | - | 412 | 62 | 474 | 474 | - | - | - | - | - | - | - | - | - | 3,207 |
| 1a.1.16 | Perform Site-Specific Cost Study | - | - | - | - | - | - | 275 | 41 | 316 | 316 | - | - | - | - | - | - | - | - | - | 2,138 |
| 1a.1.17 | Prepare/submit Irradiated Fuel Management Plan | - | - | - | - | - | - | 55 | 8 | 63 | 63 | - | - | - | - | - | - | - | - | - | 428 |
| Activity Specifications | | | | | | | | | | | | | | | | | | | | | |
| 1a.1.18.1 | Prepare plant and facilities for SAFSTOR | - | - | - | - | - | - | 270 | 41 | 311 | 311 | - | - | - | - | - | - | - | - | - | 2,104 |
| 1a.1.18.2 | Plant systems | - | - | - | - | - | - | 229 | 34 | 263 | 263 | - | - | - | - | - | - | - | - | - | 1,782 |
| 1a.1.18.3 | Plant structures and buildings | - | - | - | - | - | - | 171 | 26 | 197 | 197 | - | - | - | - | - | - | - | - | - | 1,334 |
| 1a.1.18.4 | Waste management | - | - | - | - | - | - | 110 | 16 | 126 | 126 | - | - | - | - | - | - | - | - | - | 855 |
| 1a.1.18.5 | Facility and site dormancy | - | - | - | - | - | - | 110 | 16 | 126 | 126 | - | - | - | - | - | - | - | - | - | 855 |
| 1a.1.18 | Total | - | - | - | - | - | - | 891 | 134 | 1,024 | 1,024 | - | - | - | - | - | - | - | - | - | 6,930 |
| Detailed Work Procedures | | | | | | | | | | | | | | | | | | | | | |
| 1a.1.19.1 | Plant systems | - | - | - | - | - | - | 65 | 10 | 75 | 75 | - | - | - | - | - | - | - | - | - | 506 |
| 1a.1.19.2 | Facility closeout & dormancy | - | - | - | - | - | - | 66 | 10 | 76 | 76 | - | - | - | - | - | - | - | - | - | 513 |
| 1a.1.19 | Total | - | - | - | - | - | - | 131 | 20 | 151 | 151 | - | - | - | - | - | - | - | - | - | 1,019 |
| 1a.1.20 | Procure vacuum drying system | - | - | - | - | - | - | 5 | 1 | 6 | 6 | - | - | - | - | - | - | - | - | - | 43 |
| 1a.1.21 | Drain/de-energize non-cont. systems | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.22 | Drain & dry NSSS | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.23 | Drain/de-energize contaminated systems | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1.24 | Decon/secure contaminated systems | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - |
| 1a.1 | Subtotal Period 1a Activity Costs | - | - | - | - | - | - | 2,854 | 490 | 3,345 | 3,345 | - | - | - | - | - | - | - | - | - | 18,981 |
| Period 1a Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 1a.3.1 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 1,330 | 199 | 1,529 | - | 1,529 | - | - | - | - | - | - | - | - | - |
| 1a.3.2 | Retention and Severance | - | - | - | - | - | - | 8,394 | 1,259 | 9,653 | 9,653 | - | - | - | - | - | - | - | - | - | - |
| 1a.3.3 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 1,249 | - | 1,249 | - | 1,249 | - | - | - | - | - | - | - | - | - |
| 1a.3 | Subtotal Period 1a Collateral Costs | - | - | - | - | - | - | 10,973 | 1,459 | 12,432 | 9,653 | 2,779 | - | - | - | - | - | - | - | - | - |
| Period 1a Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 1a.4.1 | Insurance | - | - | - | - | - | - | 1,660 | 166 | 1,826 | 1,826 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.2 | Property taxes | - | - | - | - | - | - | 3,623 | 362 | 3,985 | 3,985 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.3 | Health physics supplies | - | 604 | - | - | - | - | - | 151 | 755 | 755 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.4 | Heavy equipment rental | - | 753 | - | - | - | - | - | 113 | 866 | 866 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.5 | Disposal of DAW generated | - | - | 12 | 5 | - | 49 | - | 14 | 80 | 80 | - | - | - | 597 | - | - | - | 11,944 | 19 | - |
| 1a.4.6 | Plant energy budget | - | - | - | - | - | - | 1,621 | 243 | 1,864 | 1,864 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.7 | NRC Fees | - | - | - | - | - | - | 516 | 52 | 567 | 567 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.8 | Emergency Planning Fees | - | - | - | - | - | - | 2,174 | 217 | 2,392 | - | 2,392 | - | - | - | - | - | - | - | - | - |
| 1a.4.9 | Fixed Overhead | - | - | - | - | - | - | 1,440 | 216 | 1,656 | 1,656 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.10 | Spent Fuel Pool O&M | - | - | - | - | - | - | 422 | 63 | 486 | - | 486 | - | - | - | - | - | - | - | - | - |
| 1a.4.11 | ISFSI Operating Costs | - | - | - | - | - | - | 56 | 8 | 64 | - | 64 | - | - | - | - | - | - | - | - | - |
| 1a.4.12 | Railroad Track Maintenance | - | - | - | - | - | - | 63 | 9 | 72 | 72 | - | - | - | - | - | - | - | - | - | - |
| 1a.4.13 | Security Staff Cost | - | - | - | - | - | - | 8,328 | 1,249 | 9,577 | 9,577 | - | - | - | - | - | - | - | - | - | 122,720 |
| 1a.4.14 | Utility Staff Cost | - | - | - | - | - | - | 25,478 | 3,822 | 29,300 | 29,300 | - | - | - | - | - | - | - | - | - | 400,944 |
| 1a.4 | Subtotal Period 1a Period-Dependent Costs | - | 1,357 | 12 | 5 | - | 49 | 45,381 | 6,687 | 53,491 | 50,549 | 2,942 | - | - | 597 | - | - | - | 11,944 | 19 | 523,664 |
| 1a.0 | TOTAL PERIOD 1a COST | - | 1,357 | 12 | 5 | - | 49 | 59,209 | 8,636 | 69,267 | 63,547 | 5,720 | - | - | 597 | - | - | - | 11,944 | 19 | 542,645 |

**Prairie Island Nuclear Generating Plant
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**Table J-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|--|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|---------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| PERIOD 1b - SAFSTOR Limited DECON Activities | | | | | | | | | | | | | | | | | | | | | | |
| Period 1b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| Decontamination of Site Buildings | | | | | | | | | | | | | | | | | | | | | | |
| 1b.1.1.1 | Reactor | 1,199 | - | - | - | - | - | - | 599 | 1,798 | 1,798 | - | - | - | - | - | - | - | - | - | 17,003 | - |
| 1b.1.1.2 | Auxiliary | 1,244 | - | - | - | - | - | - | 622 | 1,866 | 1,866 | - | - | - | - | - | - | - | - | - | 17,950 | - |
| 1b.1.1.3 | Drum Transfer & Truck Loading Enclosure | 17 | - | - | - | - | - | - | 8 | 25 | 25 | - | - | - | - | - | - | - | - | - | 244 | - |
| 1b.1.1.4 | LLRW Storage Enclosure | 105 | - | - | - | - | - | - | 52 | 157 | 157 | - | - | - | - | - | - | - | - | - | 1,487 | - |
| 1b.1.1.5 | Radwaste | 47 | - | - | - | - | - | - | 23 | 70 | 70 | - | - | - | - | - | - | - | - | - | 669 | - |
| 1b.1.1.6 | Resin Disposal | 14 | - | - | - | - | - | - | 7 | 21 | 21 | - | - | - | - | - | - | - | - | - | 198 | - |
| 1b.1.1.7 | Fuel Handling of Aux Building | 911 | - | - | - | - | - | - | 455 | 1,366 | 1,366 | - | - | - | - | - | - | - | - | - | 12,414 | - |
| 1b.1.1 | Totals | 3,536 | - | - | - | - | - | - | 1,768 | 5,304 | 5,304 | - | - | - | - | - | - | - | - | - | 49,966 | - |
| 1b.1 | Subtotal Period 1b Activity Costs | 3,536 | - | - | - | - | - | - | 1,768 | 5,304 | 5,304 | - | - | - | - | - | - | - | - | - | 49,966 | - |
| Period 1b Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 1b.2.1 | Spent Fuel Pool Isolation | - | - | - | - | - | - | 8,450 | 1,268 | 9,718 | 9,718 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.2 | Subtotal Period 1b Additional Costs | - | - | - | - | - | - | 8,450 | 1,268 | 9,718 | 9,718 | - | - | - | - | - | - | - | - | - | - | - |
| Period 1b Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 1b.3.1 | Decon equipment | 1,055 | - | - | - | - | - | - | 158 | 1,213 | 1,213 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.3.2 | Process decommissioning water waste | 107 | - | 71 | 128 | - | 288 | - | 152 | 746 | 746 | - | - | - | - | 661 | - | - | - | - | 39,639 | 129 |
| 1b.3.4 | Small tool allowance | - | 59 | - | - | - | - | - | 9 | 68 | 68 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.3.5 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 309 | 46 | 356 | - | 356 | - | - | - | - | - | - | - | - | - | - |
| 1b.3.6 | Retention and Severance | - | - | - | - | - | - | 2,296 | 344 | 2,640 | 2,640 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.3.7 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 311 | - | 311 | - | 311 | - | - | - | - | - | - | - | - | - | - |
| 1b.3 | Subtotal Period 1b Collateral Costs | 1,162 | 59 | 71 | 128 | - | 288 | 2,917 | 710 | 5,334 | 4,667 | 667 | - | - | 661 | - | - | - | - | - | 39,639 | 129 |
| Period 1b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 1b.4.1 | Decon supplies | 1,334 | - | - | - | - | - | - | 333 | 1,667 | 1,667 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.2 | Insurance | - | - | - | - | - | - | 414 | 41 | 455 | 455 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.3 | Property taxes | - | - | - | - | - | - | 902 | 90 | 993 | 993 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.4 | Health physics supplies | - | 438 | - | - | - | - | - | 109 | 547 | 547 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.5 | Heavy equipment rental | - | 188 | - | - | - | - | - | 28 | 216 | 216 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.6 | Disposal of DAW generated | - | - | 13 | 5 | - | 52 | - | 15 | 85 | 85 | - | - | - | 634 | - | - | - | - | - | 12,677 | 21 |
| 1b.4.7 | Plant energy budget | - | - | - | - | - | - | 404 | 61 | 465 | 465 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.8 | NRC Fees | - | - | - | - | - | - | 98 | 10 | 108 | 108 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.9 | Emergency Planning Fees | - | - | - | - | - | - | 542 | 54 | 596 | - | 596 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.10 | Fixed Overhead | - | - | - | - | - | - | 359 | 54 | 413 | 413 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.11 | Spent Fuel Pool O&M | - | - | - | - | - | - | 105 | 16 | 121 | - | 121 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.12 | ISFSI Operating Costs | - | - | - | - | - | - | 14 | 2 | 16 | - | 16 | - | - | - | - | - | - | - | - | - | - |
| 1b.4.13 | Railroad Track Maintenance | - | - | - | - | - | - | 16 | 2 | 18 | 18 | - | - | - | - | - | - | - | - | - | - | - |
| 1b.4.14 | Security Staff Cost | - | - | - | - | - | - | 2,076 | 311 | 2,388 | 2,388 | - | - | - | - | - | - | - | - | - | - | 30,596 |
| 1b.4.15 | Utility Staff Cost | - | - | - | - | - | - | 6,714 | 1,007 | 7,722 | 7,722 | - | - | - | - | - | - | - | - | - | - | 105,271 |
| 1b.4 | Subtotal Period 1b Period-Dependent Costs | 1,334 | 626 | 13 | 5 | - | 52 | 11,645 | 2,135 | 15,809 | 15,076 | 733 | - | - | 634 | - | - | - | - | - | 12,677 | 21 |
| 1b.0 | TOTAL PERIOD 1b COST | 6,032 | 684 | 84 | 133 | - | 340 | 23,012 | 5,880 | 36,165 | 34,764 | 1,401 | - | - | 1,295 | - | - | - | - | - | 52,317 | 50,115 |
| PERIOD 1c - Preparations for SAFSTOR Dormancy | | | | | | | | | | | | | | | | | | | | | | |
| Period 1c Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| 1c.1.1 | Prepare support equipment for storage | - | 527 | - | - | - | - | - | 79 | 606 | 606 | - | - | - | - | - | - | - | - | - | 3,000 | - |
| 1c.1.2 | Install containment pressure equal. lines | - | 54 | - | - | - | - | - | 8 | 62 | 62 | - | - | - | - | - | - | - | - | - | 700 | - |
| 1c.1.3 | Interim survey prior to dormancy | - | - | - | - | - | - | 733 | 220 | 953 | 953 | - | - | - | - | - | - | - | - | - | 12,801 | - |
| 1c.1.4 | Secure building accesses | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - | - |
| 1c.1.5 | Prepare & submit interim report | - | - | - | - | - | - | 32 | 5 | 37 | 37 | - | - | - | - | - | - | - | - | - | - | 249 |
| 1c.1 | Subtotal Period 1c Activity Costs | - | 581 | - | - | - | - | 765 | 312 | 1,658 | 1,658 | - | - | - | - | - | - | - | - | - | 16,501 | 249 |
| Period 1c Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 1c.3.1 | Process decommissioning water waste | 91 | - | 60 | 109 | - | 245 | - | 129 | 634 | 634 | - | - | - | 561 | - | - | - | - | - | 33,685 | 109 |
| 1c.3.3 | Small tool allowance | - | 5 | - | - | - | - | - | 1 | 6 | 6 | - | - | - | - | - | - | - | - | - | - | - |
| 1c.3.4 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 90 | 13 | 103 | - | 103 | - | - | - | - | - | - | - | - | - | - |
| 1c.3.5 | Retention and Severance | - | - | - | - | - | - | 1,722 | 258 | 1,980 | 1,980 | - | - | - | - | - | - | - | - | - | - | - |
| 1c.3.6 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 311 | - | 311 | - | 311 | - | - | - | - | - | - | - | - | - | - |
| 1c.3 | Subtotal Period 1c Collateral Costs | 91 | 5 | 60 | 109 | - | 245 | 2,123 | 401 | 3,034 | 2,619 | 415 | - | - | 561 | - | - | - | - | - | 33,685 | 109 |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table J-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|---|--------------|--------------|-----------------|-----------------|---------------------------|---------------------|---------------|-------------------|----------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| Period 1c Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 1c.4.1 | Insurance | - | - | - | - | - | - | 414 | 41 | 455 | 455 | - | - | - | - | - | - | - | - | - | - |
| 1c.4.2 | Property taxes | - | - | - | - | - | - | 901 | 90 | 991 | 991 | - | - | - | - | - | - | - | - | - | - |
| 1c.4.3 | Health physics supplies | - | 248 | - | - | - | - | - | 62 | 309 | 309 | - | - | - | - | - | - | - | - | - | - |
| 1c.4.4 | Heavy equipment rental | - | 188 | - | - | - | - | - | 28 | 216 | 216 | - | - | - | - | - | - | - | - | - | - |
| 1c.4.5 | Disposal of DAW generated | - | - | 3 | 1 | - | 13 | - | 4 | 20 | 20 | - | - | - | 152 | - | - | - | 3,039 | 5 | - |
| 1c.4.6 | Plant energy budget | - | - | - | - | - | - | 404 | 61 | 465 | 465 | - | - | - | - | - | - | - | - | - | - |
| 1c.4.7 | NRC Fees | - | - | - | - | - | - | 98 | 10 | 108 | 108 | - | - | - | - | - | - | - | - | - | - |
| 1c.4.8 | Emergency Planning Fees | - | - | - | - | - | - | 542 | 54 | 596 | - | 596 | - | - | - | - | - | - | - | - | - |
| 1c.4.9 | Fixed Overhead | - | - | - | - | - | - | 359 | 54 | 413 | 413 | - | - | - | - | - | - | - | - | - | - |
| 1c.4.10 | Spent Fuel Pool O&M | - | - | - | - | - | - | 105 | 16 | 121 | - | 121 | - | - | - | - | - | - | - | - | - |
| 1c.4.11 | ISFSI Operating Costs | - | - | - | - | - | - | 14 | 2 | 16 | - | 16 | - | - | - | - | - | - | - | - | - |
| 1c.4.12 | Railroad Track Maintenance | - | - | - | - | - | - | 16 | 2 | 18 | 18 | - | - | - | - | - | - | - | - | - | - |
| 1c.4.13 | Security Staff Cost | - | - | - | - | - | - | 2,076 | 311 | 2,388 | 2,388 | - | - | - | - | - | - | - | - | - | 30,596 |
| 1c.4.14 | Utility Staff Cost | - | - | - | - | - | - | 6,714 | 1,007 | 7,722 | 7,722 | - | - | - | - | - | - | - | - | - | 105,271 |
| 1c.4 | Subtotal Period 1c Period-Dependent Costs | - | 435 | 3 | 1 | - | 13 | 11,643 | 1,742 | 13,838 | 13,104 | 733 | - | - | 152 | - | - | - | 3,039 | 5 | 135,867 |
| 1c.0 | TOTAL PERIOD 1c COST | 91 | 1,021 | 63 | 110 | - | 257 | 14,531 | 2,456 | 18,530 | 17,382 | 1,148 | - | - | 713 | - | - | - | 36,724 | 16,615 | 136,116 |
| PERIOD 1 TOTALS | | 6,123 | 3,062 | 159 | 248 | - | 646 | 96,752 | 16,972 | 123,961 | 115,692 | 8,269 | - | - | 2,605 | - | - | - | 100,985 | 66,750 | 814,628 |
| PERIOD 2a - SAFSTOR Dormancy with Wet Spent Fuel Storage | | | | | | | | | | | | | | | | | | | | | |
| Period 2a Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| 2a.1.1 | Quarterly Inspection | - | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - |
| 2a.1.2 | Semi-annual environmental survey | - | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - |
| 2a.1.3 | Prepare reports | - | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - |
| 2a.1.4 | Bituminous roof replacement | - | - | - | - | - | - | 223 | 33 | 256 | 256 | - | - | - | - | - | - | - | - | - | - |
| 2a.1.5 | Maintenance supplies | - | - | - | - | - | - | 349 | 87 | 437 | 437 | - | - | - | - | - | - | - | - | - | - |
| 2a.1 | Subtotal Period 2a Activity Costs | - | - | - | - | - | - | 572 | 121 | 693 | 693 | - | - | - | - | - | - | - | - | - | - |
| Period 2a Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 2a.2.1 | Security Modifications | - | - | - | - | - | - | 4,348 | 652 | 5,000 | 5,000 | - | - | - | - | - | - | - | - | - | - |
| 2a.2 | Subtotal Period 2a Additional Costs | - | - | - | - | - | - | 4,348 | 652 | 5,000 | 5,000 | - | - | - | - | - | - | - | - | - | - |
| Period 2a Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 2a.3.1 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 64,672 | 9,701 | 74,373 | - | 74,373 | - | - | - | - | - | - | - | - | - |
| 2a.3.2 | Retention and Severance | - | - | - | - | - | - | 11,054 | 1,658 | 12,712 | 12,712 | - | - | - | - | - | - | - | - | - | - |
| 2a.3.3 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 3,128 | - | 3,128 | - | 3,128 | - | - | - | - | - | - | - | - | - |
| 2a.3 | Subtotal Period 2a Collateral Costs | - | - | - | - | - | - | 78,854 | 11,359 | 90,213 | 12,712 | 77,501 | - | - | - | - | - | - | - | - | - |
| Period 2a Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 2a.4.1 | Insurance | - | - | - | - | - | - | 1,213 | 121 | 1,334 | 1,334 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.2 | Property taxes | - | - | - | - | - | - | 9,065 | 907 | 9,972 | 9,972 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.3 | Health physics supplies | - | 617 | - | - | - | - | - | 154 | 771 | 771 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.4 | Disposal of DAW generated | - | - | 11 | 5 | - | 47 | - | 14 | 77 | 77 | - | - | - | 576 | - | - | - | 11,523 | 19 | - |
| 2a.4.5 | Plant energy budget | - | - | - | - | - | - | 812 | 122 | 934 | 934 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.6 | NRC Fees | - | - | - | - | - | - | 536 | 54 | 590 | 590 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.7 | Emergency Planning Fees | - | - | - | - | - | - | 4,653 | 465 | 5,119 | - | 5,119 | - | - | - | - | - | - | - | - | - |
| 2a.4.8 | Fixed Overhead | - | - | - | - | - | - | 2,979 | 447 | 3,426 | 3,426 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.9 | Spent Fuel Pool O&M | - | - | - | - | - | - | 1,057 | 159 | 1,216 | - | 1,216 | - | - | - | - | - | - | - | - | - |
| 2a.4.10 | ISFSI Operating Costs | - | - | - | - | - | - | 140 | 21 | 161 | - | 161 | - | - | - | - | - | - | - | - | - |
| 2a.4.11 | Railroad Track Maintenance | - | - | - | - | - | - | 385 | 58 | 443 | 443 | - | - | - | - | - | - | - | - | - | - |
| 2a.4.12 | Security Staff Cost | - | - | - | - | - | - | 19,158 | 2,874 | 22,032 | 15,863 | 6,169 | - | - | - | - | - | - | - | - | 281,262 |
| 2a.4.13 | Utility Staff Cost | - | - | - | - | - | - | 13,370 | 2,006 | 15,376 | 12,900 | 2,476 | - | - | - | - | - | - | - | - | 205,738 |
| 2a.4 | Subtotal Period 2a Period-Dependent Costs | - | 617 | 11 | 5 | - | 47 | 53,370 | 7,400 | 61,450 | 46,309 | 15,140 | - | - | 576 | - | - | - | 11,523 | 19 | 486,999 |
| 2a.0 | TOTAL PERIOD 2a COST | - | 617 | 11 | 5 | - | 47 | 137,143 | 19,532 | 157,355 | 64,714 | 92,641 | - | - | 576 | - | - | - | 11,523 | 19 | 486,999 |
| PERIOD 2b - SAFSTOR Dormancy with Dry Spent Fuel Storage | | | | | | | | | | | | | | | | | | | | | |
| Period 2b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| 2b.1.1 | Quarterly Inspection | - | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - |
| 2b.1.2 | Semi-annual environmental survey | - | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - |
| 2b.1.3 | Prepare reports | - | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - |
| 2b.1.4 | Bituminous roof replacement | - | - | - | - | - | - | 4,402 | 660 | 5,063 | 5,063 | - | - | - | - | - | - | - | - | - | - |
| 2b.1.5 | Maintenance supplies | - | - | - | - | - | - | 6,902 | 1,726 | 8,628 | 8,628 | - | - | - | - | - | - | - | - | - | - |
| 2b.1 | Subtotal Period 2b Activity Costs | - | - | - | - | - | - | 11,305 | 2,386 | 13,691 | 13,691 | - | - | - | - | - | - | - | - | - | - |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table J-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|-----------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| Period 2b Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 2b.3.1 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 136,259 | 20,439 | 156,698 | - | 156,698 | - | - | - | - | - | - | - | - | - | - |
| 2b.3.2 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 61,783 | - | 61,783 | - | 61,783 | - | - | - | - | - | - | - | - | - | - |
| 2b.3 | Subtotal Period 2b Collateral Costs | - | - | - | - | - | - | 198,042 | 20,439 | 218,481 | - | 218,481 | - | - | - | - | - | - | - | - | - | - |
| Period 2b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 2b.4.1 | Insurance | - | - | - | - | - | - | 23,951 | 2,395 | 26,346 | 26,346 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.2 | Property taxes | - | - | - | - | - | - | 179,063 | 17,906 | 196,969 | 196,969 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.3 | Health physics supplies | - | 5,618 | - | - | - | - | - | 1,404 | 7,022 | 7,022 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.4 | Disposal of DAW generated | - | - | 101 | 41 | - | 421 | - | 122 | 685 | 685 | - | - | 5,109 | - | - | - | - | 102,180 | 167 | - | - |
| 2b.4.5 | Plant energy budget | - | - | - | - | - | - | 8,019 | 1,203 | 9,222 | 9,222 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.6 | NRC Fees | - | - | - | - | - | - | 10,191 | 1,019 | 11,211 | 11,211 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.7 | Emergency Planning Fees | - | - | - | - | - | - | 3,667 | 367 | 4,033 | - | 4,033 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.8 | Fixed Overhead | - | - | - | - | - | - | 8,059 | 1,209 | 9,268 | 9,268 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.9 | ISFSI Operating Costs | - | - | - | - | - | - | 2,768 | 415 | 3,183 | - | 3,183 | - | - | - | - | - | - | - | - | - | - |
| 2b.4.10 | Railroad Track Maintenance | - | - | - | - | - | - | 3,092 | 464 | 3,556 | 3,556 | - | - | - | - | - | - | - | - | - | - | - |
| 2b.4.11 | Security Staff Cost | - | - | - | - | - | - | 138,043 | 20,706 | 158,749 | 34,925 | 123,825 | - | - | - | - | - | - | - | - | - | 1,851,793 |
| 2b.4.12 | Utility Staff Cost | - | - | - | - | - | - | 67,547 | 10,132 | 77,680 | 48,783 | 28,897 | - | - | - | - | - | - | - | - | - | 1,028,774 |
| 2b.4 | Subtotal Period 2b Period-Dependent Costs | - | 5,618 | 101 | 41 | - | 421 | 444,401 | 57,343 | 507,924 | 347,987 | 159,938 | - | 5,109 | - | - | - | - | 102,180 | 167 | - | 2,880,567 |
| 2b.0 | TOTAL PERIOD 2b COST | - | 5,618 | 101 | 41 | - | 421 | 653,748 | 80,167 | 740,096 | 361,678 | 378,419 | - | - | 5,109 | - | - | - | 102,180 | 167 | - | 2,880,567 |
| PERIOD 2 TOTALS | | - | 6,235 | 113 | 46 | - | 468 | 790,891 | 99,699 | 897,452 | 426,392 | 471,060 | - | - | 5,685 | - | - | - | 113,703 | 185 | - | 3,367,566 |
| PERIOD 3a - Reactivate Site Following SAFSTOR Dormancy | | | | | | | | | | | | | | | | | | | | | | |
| Period 3a Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| 3a.1.1 | Prepare preliminary decommissioning cost | - | - | - | - | - | - | 71 | 11 | 82 | 82 | - | - | - | - | - | - | - | - | - | - | 556 |
| 3a.1.2 | Review plant dwgs & specs. | - | - | - | - | - | - | 253 | 38 | 291 | 291 | - | - | - | - | - | - | - | - | - | - | 1,967 |
| 3a.1.3 | Perform detailed rad survey | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - | - |
| 3a.1.4 | End product description | - | - | - | - | - | - | 55 | 8 | 63 | 63 | - | - | - | - | - | - | - | - | - | - | 428 |
| 3a.1.5 | Detailed by-product inventory | - | - | - | - | - | - | 71 | 11 | 82 | 82 | - | - | - | - | - | - | - | - | - | - | 556 |
| 3a.1.6 | Define major work sequence | - | - | - | - | - | - | 412 | 62 | 474 | 474 | - | - | - | - | - | - | - | - | - | - | 3,207 |
| 3a.1.7 | Perform SER and EA | - | - | - | - | - | - | 170 | 26 | 196 | 196 | - | - | - | - | - | - | - | - | - | - | 1,326 |
| 3a.1.8 | Perform Site-Specific Cost Study | - | - | - | - | - | - | 275 | 41 | 316 | 316 | - | - | - | - | - | - | - | - | - | - | 2,138 |
| Activity Specifications | | | | | | | | | | | | | | | | | | | | | | |
| 3a.1.9.1 | Re-activate plant & temporary facilities | - | - | - | - | - | - | 405 | 61 | 466 | 419 | - | 47 | - | - | - | - | - | - | - | - | 3,151 |
| 3a.1.9.2 | Plant systems | - | - | - | - | - | - | 229 | 34 | 263 | 237 | - | 26 | - | - | - | - | - | - | - | - | 1,782 |
| 3a.1.9.3 | Reactor internals | - | - | - | - | - | - | 390 | 59 | 449 | 449 | - | - | - | - | - | - | - | - | - | - | 3,036 |
| 3a.1.9.4 | Reactor vessel | - | - | - | - | - | - | 357 | 54 | 411 | 411 | - | - | - | - | - | - | - | - | - | - | 2,779 |
| 3a.1.9.5 | Biological shield | - | - | - | - | - | - | 27 | 4 | 32 | 32 | - | - | - | - | - | - | - | - | - | - | 214 |
| 3a.1.9.6 | Steam generators | - | - | - | - | - | - | 171 | 26 | 197 | 197 | - | - | - | - | - | - | - | - | - | - | 1,334 |
| 3a.1.9.7 | Reinforced concrete | - | - | - | - | - | - | 88 | 13 | 101 | 51 | - | 51 | - | - | - | - | - | - | - | - | 684 |
| 3a.1.9.8 | Main Turbine | - | - | - | - | - | - | 22 | 3 | 25 | - | - | 25 | - | - | - | - | - | - | - | - | 171 |
| 3a.1.9.9 | Main Condensers | - | - | - | - | - | - | 22 | 3 | 25 | - | - | 25 | - | - | - | - | - | - | - | - | 171 |
| 3a.1.9.10 | Plant structures & buildings | - | - | - | - | - | - | 171 | 26 | 197 | 99 | - | 99 | - | - | - | - | - | - | - | - | 1,334 |
| 3a.1.9.11 | Waste management | - | - | - | - | - | - | 253 | 38 | 291 | 291 | - | - | - | - | - | - | - | - | - | - | 1,967 |
| 3a.1.9.12 | Facility & site closeout | - | - | - | - | - | - | 49 | 7 | 57 | 28 | - | 28 | - | - | - | - | - | - | - | - | 385 |
| 3a.1.9 | Total | - | - | - | - | - | - | 2,186 | 328 | 2,514 | 2,213 | - | 301 | - | - | - | - | - | - | - | - | 17,009 |
| Planning & Site Preparations | | | | | | | | | | | | | | | | | | | | | | |
| 3a.1.10 | Prepare dismantling sequence | - | - | - | - | - | - | 132 | 20 | 152 | 152 | - | - | - | - | - | - | - | - | - | - | 1,026 |
| 3a.1.11 | Plant prep. & temp. svces | - | - | - | - | - | - | 3,500 | 525 | 4,025 | 4,025 | - | - | - | - | - | - | - | - | - | - | - |
| 3a.1.12 | Design water clean-up system | - | - | - | - | - | - | 77 | 12 | 88 | 88 | - | - | - | - | - | - | - | - | - | - | 599 |
| 3a.1.13 | Rigging/Cont. Cntrl Envlp/tooling/etc. | - | - | - | - | - | - | 2,400 | 360 | 2,760 | 2,760 | - | - | - | - | - | - | - | - | - | - | - |
| 3a.1.14 | Procure casks/liners & containers | - | - | - | - | - | - | 68 | 10 | 78 | 78 | - | - | - | - | - | - | - | - | - | - | 526 |
| 3a.1 | Subtotal Period 3a Activity Costs | - | - | - | - | - | - | 9,670 | 1,451 | 11,121 | 10,820 | - | 301 | - | - | - | - | - | - | - | - | 29,336 |
| Period 3a Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 3a.2.1 | Site Characterization | - | - | - | - | - | - | 1,505 | 451 | 1,956 | 1,956 | - | - | - | - | - | - | - | - | - | 8,988 | 3,563 |
| 3a.2.2 | Mixed/Hazardous Waste | - | - | 353 | 94 | 178 | - | - | 76 | 702 | 702 | - | - | 6,132 | - | - | - | - | 351,977 | 2,348 | - | - |
| 3a.2.3 | Asbestos Abatement | - | 2,526 | 3 | 150 | - | 1,369 | - | 996 | 5,044 | 5,044 | - | - | - | 12,843 | - | - | - | 166,959 | 20,907 | - | - |
| 3a.2 | Subtotal Period 3a Additional Costs | - | 2,526 | 356 | 244 | 178 | 1,369 | 1,505 | 1,524 | 7,702 | 7,702 | - | - | 6,132 | 12,843 | - | - | - | 518,936 | 32,243 | - | 3,563 |

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**Table J-2
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SAFSTOR Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| Period 3a Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 3a.3.1 | Small tool allowance | - | 34 | - | - | - | - | - | 5 | 39 | 39 | - | - | - | - | - | - | - | - | - | - |
| 3a.3.2 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 39,506 | 5,926 | 45,431 | - | 45,431 | - | - | - | - | - | - | - | - | - |
| 3a.3.3 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 1,249 | - | 1,249 | - | 1,249 | - | - | - | - | - | - | - | - | - |
| 3a.3 | Subtotal Period 3a Collateral Costs | - | 34 | - | - | - | - | 40,755 | 5,931 | 46,720 | 39 | 46,680 | - | - | - | - | - | - | - | - | - |
| Period 3a Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 3a.4.1 | Insurance | - | - | - | - | - | - | 484 | 48 | 533 | 307 | 225 | - | - | - | - | - | - | - | - | - |
| 3a.4.2 | Property taxes | - | - | - | - | - | - | 3,546 | 355 | 3,900 | 2,500 | 1,400 | - | - | - | - | - | - | - | - | - |
| 3a.4.3 | Health physics supplies | - | 641 | - | - | - | - | - | 160 | 802 | 802 | - | - | - | - | - | - | - | - | - | - |
| 3a.4.4 | Heavy equipment rental | - | 753 | - | - | - | - | - | 113 | 866 | 866 | - | - | - | - | - | - | - | - | - | - |
| 3a.4.5 | Disposal of DAW generated | - | - | 10 | 4 | - | 40 | - | 11 | 64 | 64 | - | - | - | 481 | - | - | - | 9,613 | 16 | - |
| 3a.4.6 | Plant energy budget | - | - | - | - | - | - | 1,621 | 243 | 1,864 | 1,864 | - | - | - | - | - | - | - | - | - | - |
| 3a.4.7 | NRC ISFSI Fees | - | - | - | - | - | - | 42 | 4 | 46 | - | 46 | - | - | - | - | - | - | - | - | - |
| 3a.4.8 | NRC Fees | - | - | - | - | - | - | 260 | 26 | 286 | 286 | - | - | - | - | - | - | - | - | - | - |
| 3a.4.9 | Emergency Planning Fees | - | - | - | - | - | - | 74 | 7 | 82 | - | 82 | - | - | - | - | - | - | - | - | - |
| 3a.4.10 | Fixed Overhead | - | - | - | - | - | - | 1,440 | 216 | 1,656 | 1,656 | - | - | - | - | - | - | - | - | - | - |
| 3a.4.11 | ISFSI Operating Costs | - | - | - | - | - | - | 56 | 8 | 64 | - | 64 | - | - | - | - | - | - | - | - | - |
| 3a.4.12 | Railroad Track Maintenance | - | - | - | - | - | - | 63 | 9 | 72 | 72 | - | - | - | - | - | - | - | - | - | - |
| 3a.4.13 | Security Staff Cost | - | - | - | - | - | - | 368 | 55 | 424 | 424 | - | - | - | - | - | - | - | - | - | 6,240 |
| 3a.4.14 | Utility Staff Cost | - | - | - | - | - | - | 12,056 | 1,808 | 13,864 | 13,379 | 485 | - | - | - | - | - | - | - | - | 199,680 |
| 3a.4 | Subtotal Period 3a Period-Dependent Costs | - | 1,394 | 10 | 4 | - | 40 | 20,010 | 3,066 | 24,523 | 22,220 | 2,302 | - | - | 481 | - | - | - | 9,613 | 16 | 205,920 |
| 3a.0 | TOTAL PERIOD 3a COST | - | 3,954 | 366 | 248 | 178 | 1,409 | 71,939 | 11,971 | 90,065 | 40,781 | 48,983 | 301 | 6,132 | 13,324 | - | - | - | 528,549 | 32,259 | 238,819 |
| PERIOD 3b - Decommissioning Preparations | | | | | | | | | | | | | | | | | | | | | |
| Period 3b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| Detailed Work Procedures | | | | | | | | | | | | | | | | | | | | | |
| 3b.1.1.1 | Plant systems | - | - | - | - | - | - | 260 | 39 | 299 | 269 | - | 30 | - | - | - | - | - | - | - | 2,024 |
| 3b.1.1.2 | Reactor internals | - | - | - | - | - | - | 137 | 21 | 158 | 158 | - | - | - | - | - | - | - | - | - | 1,069 |
| 3b.1.1.3 | Remaining buildings | - | - | - | - | - | - | 74 | 11 | 85 | 21 | - | 64 | - | - | - | - | - | - | - | 577 |
| 3b.1.1.4 | CRD cooling assembly | - | - | - | - | - | - | 55 | 8 | 63 | 63 | - | - | - | - | - | - | - | - | - | 428 |
| 3b.1.1.5 | CRD housings & ICI tubes | - | - | - | - | - | - | 55 | 8 | 63 | 63 | - | - | - | - | - | - | - | - | - | 428 |
| 3b.1.1.6 | Incore instrumentation | - | - | - | - | - | - | 55 | 8 | 63 | 63 | - | - | - | - | - | - | - | - | - | 428 |
| 3b.1.1.7 | Reactor vessel | - | - | - | - | - | - | 199 | 30 | 229 | 229 | - | - | - | - | - | - | - | - | - | 1,552 |
| 3b.1.1.8 | Facility closeout | - | - | - | - | - | - | 66 | 10 | 76 | 38 | - | 38 | - | - | - | - | - | - | - | 513 |
| 3b.1.1.9 | Missile shields | - | - | - | - | - | - | 25 | 4 | 28 | 28 | - | - | - | - | - | - | - | - | - | 192 |
| 3b.1.1.10 | Biological shield | - | - | - | - | - | - | 66 | 10 | 76 | 76 | - | - | - | - | - | - | - | - | - | 513 |
| 3b.1.1.11 | Steam generators | - | - | - | - | - | - | 253 | 38 | 291 | 291 | - | - | - | - | - | - | - | - | - | 1,967 |
| 3b.1.1.12 | Reinforced concrete | - | - | - | - | - | - | 55 | 8 | 63 | 32 | - | 32 | - | - | - | - | - | - | - | 428 |
| 3b.1.1.13 | Main Turbine | - | - | - | - | - | - | 86 | 13 | 99 | - | - | 99 | - | - | - | - | - | - | - | 667 |
| 3b.1.1.14 | Main Condensers | - | - | - | - | - | - | 86 | 13 | 99 | - | - | 99 | - | - | - | - | - | - | - | 667 |
| 3b.1.1.15 | Auxiliary building | - | - | - | - | - | - | 150 | 23 | 173 | 155 | - | 17 | - | - | - | - | - | - | - | 1,167 |
| 3b.1.1.16 | Reactor building | - | - | - | - | - | - | 150 | 23 | 173 | 155 | - | 17 | - | - | - | - | - | - | - | 1,167 |
| 3b.1.1 | Total | - | - | - | - | - | - | 1,772 | 266 | 2,038 | 1,643 | - | 395 | - | - | - | - | - | - | - | 13,787 |
| 3b.1 | Subtotal Period 3b Activity Costs | - | - | - | - | - | - | 1,772 | 266 | 2,038 | 1,643 | - | 395 | - | - | - | - | - | - | - | 13,787 |
| Period 3b Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 3b.3.1 | Decon equipment | 1,055 | - | - | - | - | - | - | 158 | 1,213 | 1,213 | - | - | - | - | - | - | - | - | - | - |
| 3b.3.2 | DOC staff relocation expenses | - | - | - | - | - | - | 1,264 | 190 | 1,454 | 1,454 | - | - | - | - | - | - | - | - | - | - |
| 3b.3.3 | Pipe cutting equipment | - | 1,200 | - | - | - | - | - | 180 | 1,380 | 1,380 | - | - | - | - | - | - | - | - | - | - |
| 3b.3.4 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 623 | - | 623 | - | 623 | - | - | - | - | - | - | - | - | - |
| 3b.3 | Subtotal Period 3b Collateral Costs | 1,055 | 1,200 | - | - | - | - | 1,887 | 528 | 4,669 | 4,047 | 623 | - | - | - | - | - | - | - | - | - |
| Period 3b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 3b.4.1 | Decon supplies | 38 | - | - | - | - | - | - | 9 | 47 | 47 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.2 | Insurance | - | - | - | - | - | - | 241 | 24 | 266 | 266 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.3 | Property taxes | - | - | - | - | - | - | 1,667 | 167 | 1,834 | 1,175 | 658 | - | - | - | - | - | - | - | - | - |
| 3b.4.4 | Health physics supplies | - | 274 | - | - | - | - | - | 68 | 342 | 342 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.5 | Heavy equipment rental | - | 375 | - | - | - | - | - | 56 | 432 | 432 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.6 | Disposal of DAW generated | - | - | 5 | 2 | - | 22 | - | 6 | 35 | 35 | - | - | - | 264 | - | - | - | 5,286 | 9 | - |
| 3b.4.7 | Plant energy budget | - | - | - | - | - | - | 808 | 121 | 930 | 930 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.8 | NRC ISFSI Fees | - | - | - | - | - | - | 21 | 2 | 23 | - | 23 | - | - | - | - | - | - | - | - | - |
| 3b.4.9 | NRC Fees | - | - | - | - | - | - | 129 | 13 | 142 | 142 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.10 | Emergency Planning Fees | - | - | - | - | - | - | 37 | 4 | 41 | - | 41 | - | - | - | - | - | - | - | - | - |
| 3b.4.11 | Fixed Overhead | - | - | - | - | - | - | 718 | 108 | 826 | 826 | - | - | - | - | - | - | - | - | - | - |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table J-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|--|---|--------------|--------------|-----------------|-----------------|---------------------------|---------------------|---------------|-------------------|----------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| Period 3b Period-Dependent Costs (continued) | | | | | | | | | | | | | | | | | | | | | |
| 3b.4.12 | ISFSI Operating Costs | - | - | - | - | - | - | 28 | 4 | 32 | - | 32 | - | - | - | - | - | - | - | - | - |
| 3b.4.13 | Railroad Track Maintenance | - | - | - | - | - | - | 31 | 5 | 36 | 36 | - | - | - | - | - | - | - | - | - | - |
| 3b.4.14 | Security Staff Cost | - | - | - | - | - | - | 184 | 28 | 211 | 211 | - | - | - | - | - | - | - | - | - | 3,111 |
| 3b.4.15 | DOC Staff Cost | - | - | - | - | - | - | 3,727 | 559 | 4,287 | 4,287 | - | - | - | - | - | - | - | - | - | 42,523 |
| 3b.4.16 | Utility Staff Cost | - | - | - | - | - | - | 6,011 | 902 | 6,913 | 6,671 | 242 | - | - | - | - | - | - | - | - | 99,566 |
| 3b.4 | Subtotal Period 3b Period-Dependent Costs | 38 | 649 | 5 | 2 | - | 22 | 13,604 | 2,076 | 16,396 | 15,400 | 996 | - | - | 264 | - | - | - | 5,286 | 9 | 145,201 |
| 3b.0 | TOTAL PERIOD 3b COST | 1,092 | 1,849 | 5 | 2 | - | 22 | 17,262 | 2,870 | 23,103 | 21,089 | 1,619 | 395 | - | 264 | - | - | - | 5,286 | 9 | 158,988 |
| PERIOD 3 TOTALS | | 1,092 | 5,803 | 371 | 250 | 178 | 1,430 | 89,202 | 14,841 | 113,168 | 61,871 | 50,601 | 696 | 6,132 | 13,588 | - | - | - | 533,835 | 32,267 | 397,807 |
| PERIOD 4a - Large Component Removal | | | | | | | | | | | | | | | | | | | | | |
| Period 4a Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| Nuclear Steam Supply System Removal | | | | | | | | | | | | | | | | | | | | | |
| 4a.1.1.1 | Reactor Coolant Piping | 11 | 42 | 10 | 11 | 66 | 94 | - | 52 | 285 | 285 | - | - | 240 | 254 | - | - | - | 33,680 | 778 | - |
| 4a.1.1.2 | Pressurizer Relief Tank | 5 | 19 | 6 | 7 | 44 | 62 | - | 31 | 174 | 174 | - | - | 160 | 169 | - | - | - | 22,441 | 352 | - |
| 4a.1.1.3 | Reactor Coolant Pumps & Motors | 13 | 60 | 46 | 85 | - | 463 | - | 155 | 822 | 822 | - | - | - | 2,332 | - | - | - | 295,800 | 1,226 | 80 |
| 4a.1.1.4 | Pressurizer | - | 77 | 382 | 91 | - | 776 | - | 265 | 1,591 | 1,591 | - | - | - | 2,196 | - | - | - | 158,199 | 1,346 | 750 |
| 4a.1.1.5 | Steam Generators | - | 3,307 | 1,690 | 1,743 | 2,409 | 3,885 | - | 2,590 | 15,625 | 15,625 | - | - | 18,672 | 10,990 | - | - | - | 1,581,180 | 10,253 | 2,250 |
| 4a.1.1.6 | CRDMs/ICIs/Service Structure Removal | 63 | 248 | 205 | 44 | 326 | 454 | - | 283 | 1,623 | 1,623 | - | - | 2,138 | 2,146 | - | - | - | 165,025 | 4,449 | - |
| 4a.1.1.7 | Reactor Vessel Internals | 51 | 4,650 | 13,353 | 862 | - | 7,848 | 278 | 11,032 | 38,074 | 38,074 | - | - | - | 1,174 | - | 673 | - | 167,337 | 22,373 | 1,053 |
| 4a.1.1.8 | Reactor Vessel | - | 5,835 | 1,653 | 442 | - | 3,268 | 278 | 6,576 | 18,053 | 18,053 | - | - | - | 9,245 | - | - | - | 579,324 | 22,373 | 1,053 |
| 4a.1.1 | Totals | 144 | 14,237 | 17,346 | 3,284 | 2,845 | 16,851 | 556 | 20,984 | 76,247 | 76,247 | - | - | 21,210 | 28,505 | - | 673 | - | 3,002,986 | 63,151 | 5,187 |
| Removal of Major Equipment | | | | | | | | | | | | | | | | | | | | | |
| 4a.1.2 | Main Turbine/Generator | - | 292 | 116 | 35 | 555 | - | - | 173 | 1,170 | 1,170 | - | - | 2,243 | - | - | - | - | 134,601 | 4,116 | - |
| 4a.1.3 | Main Condensers | - | 2,510 | 79 | 33 | 742 | - | - | 752 | 4,115 | 4,115 | - | - | 4,000 | - | - | - | - | 180,000 | 34,978 | - |
| Cascading Costs from Clean Building Demolition | | | | | | | | | | | | | | | | | | | | | |
| 4a.1.4.1 | Reactor | - | 794 | - | - | - | - | - | 119 | 913 | 913 | - | - | - | - | - | - | - | - | 7,589 | - |
| 4a.1.4.2 | Auxiliary | - | 221 | - | - | - | - | - | 33 | 254 | 254 | - | - | - | - | - | - | - | - | 1,309 | - |
| 4a.1.4.3 | Radwaste | - | 9 | - | - | - | - | - | 1 | 10 | 10 | - | - | - | - | - | - | - | - | 65 | - |
| 4a.1.4 | Totals | - | 1,023 | - | - | - | - | - | 154 | 1,177 | 1,177 | - | - | - | - | - | - | - | - | 8,963 | - |
| Disposal of Plant Systems | | | | | | | | | | | | | | | | | | | | | |
| 4a.1.5.1 | Admin Bldg Ventilation | - | 6 | - | - | - | - | - | 1 | 7 | - | - | 7 | - | - | - | - | - | - | 90 | - |
| 4a.1.5.2 | Air Removal | - | 29 | - | - | - | - | - | 4 | 33 | - | - | 33 | - | - | - | - | - | - | 422 | - |
| 4a.1.5.3 | Auxiliary Feedwater | - | 46 | - | - | - | - | - | 7 | 53 | - | - | 53 | - | - | - | - | - | - | 676 | - |
| 4a.1.5.4 | Auxiliary Feedwater - RCA | - | 38 | 0 | 1 | 30 | - | - | 14 | 84 | 84 | - | - | 178 | - | - | - | - | 7,214 | 486 | - |
| 4a.1.5.5 | Bleed Steam | - | 90 | - | - | - | - | - | 13 | 103 | - | - | 103 | - | - | - | - | - | - | 1,331 | - |
| 4a.1.5.6 | Caustic Addition - RCA | - | 40 | 0 | 2 | 40 | - | - | 16 | 99 | 99 | - | - | 240 | - | - | - | - | 9,761 | 468 | - |
| 4a.1.5.7 | Chemical Feed | - | 17 | - | - | - | - | - | 3 | 20 | - | - | 20 | - | - | - | - | - | - | 261 | - |
| 4a.1.5.8 | Chemical Feed - RCA | - | 3 | 0 | 0 | 3 | - | - | 1 | 7 | 7 | - | - | 16 | - | - | - | - | 634 | 31 | - |
| 4a.1.5.9 | Circulating Water | - | 27 | - | - | - | - | - | 4 | 32 | - | - | 32 | - | - | - | - | - | - | 401 | - |
| 4a.1.5.10 | Condensate | - | 525 | - | - | - | - | - | 79 | 603 | - | - | 603 | - | - | - | - | - | - | 7,537 | - |
| 4a.1.5.11 | Condensate Polishing | - | 208 | - | - | - | - | - | 31 | 239 | - | - | 239 | - | - | - | - | - | - | 2,987 | - |
| 4a.1.5.12 | Condensate Polishing - RCA | - | 38 | 1 | 4 | 81 | - | - | 22 | 145 | 145 | - | - | 483 | - | - | - | - | 19,616 | 493 | - |
| 4a.1.5.13 | Electro-Hydraulic | - | 10 | - | - | - | - | - | 1 | 11 | - | - | 11 | - | - | - | - | - | - | 143 | - |
| 4a.1.5.14 | External Circulating Water | - | 26 | - | - | - | - | - | 4 | 30 | - | - | 30 | - | - | - | - | - | - | 385 | - |
| 4a.1.5.15 | External Circulating Water - RCA | - | 72 | 1 | 5 | 121 | - | - | 37 | 237 | 237 | - | - | 721 | - | - | - | - | 29,284 | 938 | - |
| 4a.1.5.16 | Feedwater | - | 127 | - | - | - | - | - | 19 | 146 | - | - | 146 | - | - | - | - | - | - | 1,840 | - |
| 4a.1.5.17 | Feedwater - RCA | - | 248 | 8 | 31 | 694 | - | - | 171 | 1,152 | 1,152 | - | - | 4,147 | - | - | - | - | 168,414 | 3,377 | - |
| 4a.1.5.18 | Gland Seal | - | 34 | - | - | - | - | - | 5 | 39 | - | - | 39 | - | - | - | - | - | - | 504 | - |
| 4a.1.5.19 | Heater Drain | - | 384 | - | - | - | - | - | 58 | 441 | - | - | 441 | - | - | - | - | - | - | 5,638 | - |
| 4a.1.5.20 | Hypobromous Acid Feed | - | 6 | - | - | - | - | - | 1 | 7 | - | - | 7 | - | - | - | - | - | - | 86 | - |
| 4a.1.5.21 | Hypobromous Acid Feed - RCA | - | 1 | 0 | 0 | 0 | - | - | 0 | 2 | 2 | - | - | 2 | - | - | - | - | 100 | 12 | - |
| 4a.1.5.22 | Internal Circ Water & CDSR | - | 25 | - | - | - | - | - | 4 | 29 | - | - | 29 | - | - | - | - | - | - | 366 | - |
| 4a.1.5.23 | Main Gen/Exciter/Transformer | - | 0 | - | - | - | - | - | 0 | 0 | - | - | 0 | - | - | - | - | - | - | 5 | - |
| 4a.1.5.24 | Main Steam | - | 101 | - | - | - | - | - | 15 | 116 | - | - | 116 | - | - | - | - | - | - | 1,482 | - |
| 4a.1.5.25 | Main Steam - RCA | - | 380 | 11 | 38 | 864 | - | - | 231 | 1,525 | 1,525 | - | - | 5,166 | - | - | - | - | 209,799 | 5,146 | - |
| 4a.1.5.26 | Repairable Spare Snubbers | - | 6 | 0 | 0 | 2 | - | - | 2 | 10 | 10 | - | - | 12 | - | - | - | - | 490 | 82 | - |
| 4a.1.5.27 | Steam Exclusion | - | 2 | - | - | - | - | - | 0 | 2 | - | - | 2 | - | - | - | - | - | - | 32 | - |
| 4a.1.5.28 | Steam Exclusion - RCA | - | 4 | 0 | 0 | 4 | - | - | 2 | 10 | 10 | - | - | 24 | - | - | - | - | 966 | 47 | - |
| 4a.1.5.29 | Steam Generator Blowdown | - | 378 | 21 | 27 | 319 | 215 | - | 202 | 1,162 | 1,162 | - | - | 1,906 | 631 | - | - | - | 118,130 | 5,179 | - |
| 4a.1.5.30 | Steam Generators | - | 5 | - | - | - | - | - | 1 | 6 | - | - | 6 | - | - | - | - | - | - | 75 | - |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table J-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| Disposal of Plant Systems (continued) | | | | | | | | | | | | | | | | | | | | | |
| 4a.1.5.31 | Turbine & Moisture Separators | - | 377 | - | - | - | - | - | 57 | 434 | - | - | 434 | - | - | - | - | - | - | 5,472 | - |
| 4a.1.5.32 | Turbine Oil Purification | - | 53 | - | - | - | - | - | 8 | 61 | - | - | 61 | - | - | - | - | - | - | 757 | - |
| 4a.1.5.33 | Water Treatment | - | 453 | - | - | - | - | - | 68 | 521 | - | - | 521 | - | - | - | - | - | - | 6,677 | - |
| 4a.1.5.34 | Water Treatment - RCA | - | 20 | 0 | 1 | 19 | - | - | 8 | 49 | 49 | - | - | 115 | - | - | - | - | - | 252 | - |
| 4a.1.5 | Totals | - | 3,779 | 43 | 108 | 2,177 | 215 | - | 1,091 | 7,413 | 4,480 | - | 2,933 | 13,010 | 631 | - | - | - | - | 569,060 | 53,681 |
| 4a.1.6 | Scaffolding in support of decommissioning | - | 2,865 | 22 | 10 | 188 | 30 | - | 755 | 3,870 | 3,870 | - | - | 1,012 | 89 | - | - | - | - | 51,216 | 23,719 |
| 4a.1 | Subtotal Period 4a Activity Costs | 144 | 24,706 | 17,607 | 3,470 | 6,506 | 17,096 | 556 | 23,908 | 93,993 | 91,059 | - | 2,933 | 41,476 | 29,226 | - | 673 | - | - | 3,937,863 | 188,606 |
| Period 4a Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 4a.2.1 | Retired RPV Upper Internals Package | - | 128 | 166 | 58 | - | 1,583 | - | 944 | 2,879 | 2,879 | - | - | - | 572 | 125 | - | - | - | 49,800 | 1,667 |
| 4a.2 | Subtotal Period 4a Additional Costs | - | 128 | 166 | 58 | - | 1,583 | - | 944 | 2,879 | 2,879 | - | - | - | 572 | 125 | - | - | - | 49,800 | 1,667 |
| Period 4a Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 4a.3.1 | Process decommissioning water waste | 3 | - | 4 | 8 | - | 17 | - | 7 | 39 | 39 | - | - | - | 40 | - | - | - | - | 2,408 | 8 |
| 4a.3.3 | Small tool allowance | - | 241 | - | - | - | - | - | 36 | 277 | 249 | - | 28 | - | - | - | - | - | - | - | - |
| 4a.3.4 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 1,660 | - | 1,660 | - | 1,660 | - | - | - | - | - | - | - | - | - |
| 4a.3 | Subtotal Period 4a Collateral Costs | 3 | 241 | 4 | 8 | - | 17 | 1,660 | 43 | 1,976 | 288 | 1,660 | 28 | - | 40 | - | - | - | - | 2,408 | 8 |
| Period 4a Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 4a.4.1 | Decon supplies | 100 | - | - | - | - | - | - | 25 | 125 | 125 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.2 | Insurance | - | - | - | - | - | - | 643 | 64 | 708 | 708 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.3 | Property taxes | - | - | - | - | - | - | 4,395 | 439 | 4,834 | 2,954 | 1,881 | - | - | - | - | - | - | - | - | - |
| 4a.4.4 | Health physics supplies | - | 1,882 | - | - | - | - | - | 470 | 2,352 | 2,352 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.5 | Heavy equipment rental | - | 3,325 | - | - | - | - | - | 499 | 3,824 | 3,824 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.6 | Disposal of DAW generated | - | - | 70 | 29 | - | 293 | - | 85 | 477 | 477 | - | - | - | 3,556 | - | - | - | - | 71,113 | 116 |
| 4a.4.7 | Plant energy budget | - | - | - | - | - | - | 2,047 | 307 | 2,354 | 2,354 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.8 | NRC ISFSI Fees | - | - | - | - | - | - | 55 | 6 | 61 | - | 61 | - | - | - | - | - | - | - | - | - |
| 4a.4.9 | NRC Fees | - | - | - | - | - | - | 420 | 42 | 461 | 461 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.10 | Emergency Planning Fees | - | - | - | - | - | - | 99 | 10 | 108 | - | 108 | - | - | - | - | - | - | - | - | - |
| 4a.4.11 | Fixed Overhead | - | - | - | - | - | - | 1,581 | 237 | 1,818 | 1,818 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.12 | Liquid Radwaste Processing Equipment/Services | - | - | - | - | - | - | 565 | 85 | 649 | 649 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.13 | ISFSI Operating Costs | - | - | - | - | - | - | 74 | 11 | 86 | - | 86 | - | - | - | - | - | - | - | - | - |
| 4a.4.14 | Railroad Track Maintenance | - | - | - | - | - | - | 83 | 12 | 96 | 96 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.15 | Remedial Actions Surveys | - | - | - | - | - | - | 1,489 | 223 | 1,712 | 1,712 | - | - | - | - | - | - | - | - | - | - |
| 4a.4.16 | Security Staff Cost | - | - | - | - | - | - | 5,911 | 887 | 6,798 | 5,159 | 1,638 | - | - | - | - | - | - | - | - | 91,140 |
| 4a.4.17 | DOC Staff Cost | - | - | - | - | - | - | 17,103 | 2,565 | 19,668 | 19,668 | - | - | - | - | - | - | - | - | - | 189,200 |
| 4a.4.18 | Utility Staff Cost | - | - | - | - | - | - | 21,408 | 3,211 | 24,619 | 23,856 | 763 | - | - | - | - | - | - | - | - | 337,712 |
| 4a.4 | Subtotal Period 4a Period-Dependent Costs | 100 | 5,207 | 70 | 29 | - | 293 | 55,871 | 9,179 | 70,749 | 66,212 | 4,537 | - | - | 3,556 | - | - | - | - | 71,113 | 116 |
| 4a.0 | TOTAL PERIOD 4a COST | 246 | 30,282 | 17,847 | 3,564 | 6,506 | 18,989 | 58,087 | 34,074 | 169,596 | 160,439 | 6,196 | 2,961 | 41,476 | 33,394 | 125 | 673 | - | - | 4,061,184 | 190,397 |
| PERIOD 4b - Site Decontamination | | | | | | | | | | | | | | | | | | | | | |
| Period 4b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| 4b.1.1 | Remove spent fuel racks | 314 | 35 | 86 | 41 | - | 703 | - | 356 | 1,535 | 1,535 | - | - | - | 2,092 | - | - | - | - | 132,919 | 576 |
| Disposal of Plant Systems | | | | | | | | | | | | | | | | | | | | | |
| 4b.1.2.1 | ADT & Misc Ventilation | - | 22 | 1 | 1 | 26 | 3 | - | 10 | 63 | 63 | - | - | 153 | 9 | - | - | - | - | 6,803 | 325 |
| 4b.1.2.2 | Aux Bldg Normal Ventilation | - | 62 | 2 | 6 | 116 | 13 | - | 37 | 237 | 237 | - | - | 692 | 39 | - | - | - | - | 30,595 | 906 |
| 4b.1.2.3 | Aux Bldg Special Ventilation | - | 12 | 0 | 1 | 12 | 2 | - | 5 | 32 | 32 | - | - | 70 | 6 | - | - | - | - | 3,234 | 176 |
| 4b.1.2.4 | Battery Rm Special Ventilation | - | 2 | - | - | - | - | - | 0 | 2 | - | - | 2 | - | - | - | - | - | - | - | 24 |
| 4b.1.2.5 | Boron Recycle | - | 3 | 0 | 0 | 0 | 3 | - | 2 | 9 | 9 | - | - | 3 | 9 | - | - | - | - | 700 | 45 |
| 4b.1.2.6 | Chemical & Volume Control | - | 858 | 62 | 57 | 394 | 677 | - | 458 | 2,507 | 2,507 | - | - | 2,356 | 1,977 | - | - | - | - | 223,753 | 11,575 |
| 4b.1.2.7 | Cold Chemical Lab Ventilation | - | 1 | - | - | - | - | - | 0 | 1 | - | - | 1 | - | - | - | - | - | - | - | 9 |
| 4b.1.2.8 | Component Cooling - RCA | - | 647 | 25 | 88 | 2,007 | - | - | 479 | 3,246 | 3,246 | - | - | 11,996 | - | - | - | - | - | 487,169 | 8,583 |
| 4b.1.2.9 | Containment Cooling | - | 35 | - | - | - | - | - | 5 | 40 | - | - | 40 | - | - | - | - | - | - | - | 502 |
| 4b.1.2.10 | Containment Cooling - RCA | - | 302 | 6 | 20 | 459 | - | - | 148 | 934 | 934 | - | - | 2,743 | - | - | - | - | - | 111,390 | 3,949 |
| 4b.1.2.11 | Containment Hydrogen Control - RCA | - | 36 | 0 | 1 | 24 | - | - | 13 | 74 | 74 | - | - | 141 | - | - | - | - | - | 5,742 | 494 |
| 4b.1.2.12 | Containment Spray - RCA | - | 194 | 3 | 11 | 243 | - | - | 87 | 538 | 538 | - | - | 1,453 | - | - | - | - | - | 59,019 | 2,617 |
| 4b.1.2.13 | Containment Ventilation | - | 211 | 23 | 49 | 790 | 243 | - | 242 | 1,558 | 1,558 | - | - | 4,721 | 722 | - | - | - | - | 237,643 | 3,016 |
| 4b.1.2.14 | Control/Relay/Cmpt Rm Vent | - | 28 | 1 | 2 | 44 | 7 | - | 16 | 98 | 98 | - | - | 260 | 20 | - | - | - | - | 11,878 | 406 |
| 4b.1.2.15 | Cooling Water | - | 159 | - | - | - | - | - | 24 | 183 | - | - | 183 | - | - | - | - | - | - | - | 2,344 |
| 4b.1.2.16 | Cooling Water - RCA | - | 476 | 17 | 62 | 1,412 | - | - | 342 | 2,310 | 2,310 | - | - | 8,442 | - | - | - | - | - | 342,822 | 6,311 |
| 4b.1.2.17 | Cranes/Hoists/Elevators - RCA | - | 3 | 0 | 1 | 17 | - | - | 4 | 25 | 25 | - | - | 103 | - | - | - | - | - | 4,184 | 48 |
| 4b.1.2.18 | D3 Emergency Diesel | - | 10 | - | - | - | - | - | 2 | 12 | - | - | 12 | - | - | - | - | - | - | - | 141 |
| 4b.1.2.19 | D4 Emergency Diesel | - | 10 | - | - | - | - | - | 2 | 12 | - | - | 12 | - | - | - | - | - | - | - | 141 |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table J-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|---------------------------------------|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|--------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| Disposal of Plant Systems (continued) | | | | | | | | | | | | | | | | | | | | | | |
| 4b.1.2.20 | D5 Emergency Diesel | - | 0 | - | - | - | - | - | 0 | 0 | - | - | 0 | - | - | - | - | - | - | - | 5 | - |
| 4b.1.2.21 | Electrical - Clean | - | 1,714 | - | - | - | - | - | 257 | 1,972 | - | - | 1,972 | - | - | - | - | - | - | - | - | 24,276 |
| 4b.1.2.22 | Electrical - Contaminated | - | 430 | 5 | 16 | 334 | 25 | - | 167 | 978 | 978 | - | - | 1,997 | 75 | - | - | - | - | 85,887 | 5,813 | - |
| 4b.1.2.23 | Electrical - Contaminated - Fuel Pool | - | 184 | 2 | 7 | 145 | 11 | - | 72 | 421 | 421 | - | - | 864 | 33 | - | - | - | - | 37,167 | 2,488 | - |
| 4b.1.2.24 | Electrical - Decontaminated | - | 2,955 | 38 | 138 | 3,138 | - | - | 1,234 | 7,503 | 7,503 | - | - | 18,753 | - | - | - | - | - | 761,569 | 38,423 | - |
| 4b.1.2.25 | Electrical - Decontaminated - Fuel Pool | - | 1,269 | 17 | 59 | 1,350 | - | - | 530 | 3,225 | 3,225 | - | - | 8,069 | - | - | - | - | - | 327,668 | 16,495 | - |
| 4b.1.2.26 | Filter Rm Ventilation | - | 4 | 0 | 0 | 4 | 0 | - | 2 | 10 | 10 | - | - | 24 | 1 | - | - | - | - | 1,017 | 61 | - |
| 4b.1.2.27 | Fire Protection & Detection | - | 204 | - | - | - | - | - | 31 | 235 | - | - | 235 | - | - | - | - | - | - | - | 3,009 | - |
| 4b.1.2.28 | Fire Protection & Detection - RCA | - | 246 | 4 | 13 | 306 | - | - | 110 | 679 | 679 | - | - | 1,828 | - | - | - | - | - | 74,245 | 3,134 | - |
| 4b.1.2.29 | Fire Protection & Detection - RCA Fuel P | - | 37 | 1 | 2 | 48 | - | - | 17 | 105 | 105 | - | - | 286 | - | - | - | - | - | 11,622 | 476 | - |
| 4b.1.2.30 | Fuel Handling | - | 66 | 1 | 2 | 34 | 17 | - | 26 | 146 | 146 | - | - | 200 | 49 | - | - | - | - | 11,273 | 983 | - |
| 4b.1.2.31 | Fuel Oil | - | 1 | - | - | - | - | - | 0 | 1 | - | - | 1 | - | - | - | - | - | - | - | 9 | - |
| 4b.1.2.32 | HVAC - Clean | - | 151 | - | - | - | - | - | 23 | 174 | - | - | 174 | - | - | - | - | - | - | - | 2,373 | - |
| 4b.1.2.33 | HVAC - Contaminated | - | 1,112 | 29 | 87 | 1,798 | 136 | - | 598 | 3,759 | 3,759 | - | - | 10,745 | 405 | - | - | - | - | 462,103 | 14,282 | - |
| 4b.1.2.34 | HVAC - Contaminated - Fuel Pool | - | 499 | 13 | 39 | 808 | 61 | - | 268 | 1,689 | 1,689 | - | - | 4,828 | 182 | - | - | - | - | 207,612 | 6,417 | - |
| 4b.1.2.35 | Heating | - | 322 | - | - | - | - | - | 48 | 370 | - | - | 370 | - | - | - | - | - | - | - | 4,804 | - |
| 4b.1.2.36 | Heating - RCA | - | 337 | 4 | 14 | 319 | - | - | 135 | 809 | 809 | - | - | 1,907 | - | - | - | - | - | 77,458 | 4,086 | - |
| 4b.1.2.37 | Hot Lab & Sample Rm Ventilation | - | 17 | 0 | 1 | 18 | 1 | - | 8 | 46 | 46 | - | - | 107 | 4 | - | - | - | - | 4,622 | 255 | - |
| 4b.1.2.38 | Incore Instrumentation | - | 27 | 1 | 2 | 10 | 20 | - | 13 | 73 | 73 | - | - | 60 | 58 | - | - | - | - | 6,143 | 412 | - |
| 4b.1.2.39 | Misc Drains & Vents | - | 213 | 12 | 12 | 77 | 145 | - | 104 | 563 | 563 | - | - | 458 | 426 | - | - | - | - | 46,079 | 2,841 | - |
| 4b.1.2.40 | Misc Lab & Service Areas Vent | - | 118 | 8 | 8 | 62 | 84 | - | 62 | 342 | 342 | - | - | 370 | 244 | - | - | - | - | 30,899 | 1,537 | - |
| 4b.1.2.41 | Miscellaneous Gas | - | 72 | - | - | - | - | - | 11 | 83 | - | - | 83 | - | - | - | - | - | - | - | 1,073 | - |
| 4b.1.2.42 | Miscellaneous Gas - RCA | - | 134 | 1 | 4 | 100 | - | - | 49 | 289 | 289 | - | - | 600 | - | - | - | - | - | 24,378 | 1,636 | - |
| 4b.1.2.43 | Radiation Monitoring | - | 7 | - | - | - | - | - | 1 | 9 | - | - | 9 | - | - | - | - | - | - | - | 111 | - |
| 4b.1.2.44 | Radiation Monitoring - RCA | - | 65 | 1 | 2 | 53 | - | - | 25 | 145 | 145 | - | - | 316 | - | - | - | - | - | 12,826 | 782 | - |
| 4b.1.2.45 | Reactor Coolant | - | 216 | 20 | 16 | 38 | 249 | - | 126 | 666 | 666 | - | - | 229 | 730 | - | - | - | - | 56,440 | 2,891 | - |
| 4b.1.2.46 | Reactor Hot Sampling | - | 116 | 11 | 7 | 9 | 108 | - | 60 | 311 | 311 | - | - | 54 | 312 | - | - | - | - | 22,678 | 1,499 | - |
| 4b.1.2.47 | Reactor Makeup | - | 41 | - | - | - | - | - | 6 | 47 | - | - | 47 | - | - | - | - | - | - | - | 583 | - |
| 4b.1.2.48 | Reactor Makeup - RCA | - | 4 | 0 | 0 | 5 | - | - | 2 | 11 | 11 | - | - | 28 | - | - | - | - | - | 1,148 | 47 | - |
| 4b.1.2.49 | Reactor Vessel | - | 16 | 1 | 0 | 4 | 5 | - | 6 | 32 | 32 | - | - | 22 | 14 | - | - | - | - | 1,816 | 225 | - |
| 4b.1.2.50 | Residual Heat Removal | - | 354 | 84 | 86 | 477 | 1,102 | - | 457 | 2,562 | 2,562 | - | - | 2,853 | 3,244 | - | - | - | - | 324,232 | 5,039 | - |
| 4b.1.2.51 | Safeguards Chilled Water | - | 5 | - | - | - | - | - | 1 | 6 | - | - | 6 | - | - | - | - | - | - | - | 75 | - |
| 4b.1.2.52 | Safeguards Chilled Water - RCA | - | 5 | 0 | 0 | 4 | - | - | 2 | 11 | 11 | - | - | 26 | - | - | - | - | - | 1,045 | 51 | - |
| 4b.1.2.53 | Safety Injection | - | 793 | 42 | 72 | 1,117 | 395 | - | 479 | 2,898 | 2,898 | - | - | 6,676 | 1,161 | - | - | - | - | 345,708 | 11,029 | - |
| 4b.1.2.54 | Sampling | - | 48 | 3 | 2 | 6 | 32 | - | 22 | 113 | 113 | - | - | 37 | 93 | - | - | - | - | 7,628 | 645 | - |
| 4b.1.2.56 | Shield Bldg Ventilation | - | 108 | 13 | 25 | 339 | 163 | - | 124 | 771 | 771 | - | - | 2,028 | 484 | - | - | - | - | 113,139 | 1,555 | - |
| 4b.1.2.57 | Spent Fuel Pool Cooling | - | 33 | 3 | 2 | 6 | 37 | - | 19 | 101 | 101 | - | - | 39 | 107 | - | - | - | - | 8,481 | 427 | - |
| 4b.1.2.58 | Spent Fuel Pool Normal Ventilation | - | 24 | 1 | 2 | 44 | 4 | - | 14 | 90 | 90 | - | - | 265 | 12 | - | - | - | - | 11,505 | 352 | - |
| 4b.1.2.59 | Station & Instrument Air | - | 161 | - | - | - | - | - | 24 | 185 | - | - | 185 | - | - | - | - | - | - | - | 2,424 | - |
| 4b.1.2.60 | Station & Instrument Air - RCA | - | 299 | 3 | 12 | 272 | - | - | 118 | 704 | 704 | - | - | 1,625 | - | - | - | - | - | 65,986 | 3,638 | - |
| 4b.1.2.61 | Turbine Bldg Traps & Drains | - | 30 | - | - | - | - | - | 5 | 35 | - | - | 35 | - | - | - | - | - | - | - | 462 | - |
| 4b.1.2.62 | Turbine Bldg Traps & Drains - RCA | - | 30 | 0 | 1 | 30 | - | - | 12 | 73 | 73 | - | - | 180 | - | - | - | - | - | 7,321 | 344 | - |
| 4b.1.2.63 | Turbine Bldg Ventilation | - | 46 | - | - | - | - | - | 7 | 53 | - | - | 53 | - | - | - | - | - | - | - | 655 | - |
| 4b.1.2.64 | Unit Coolers | - | 23 | - | - | - | - | - | 3 | 26 | - | - | 26 | - | - | - | - | - | - | - | 332 | - |
| 4b.1.2.65 | Unit Coolers - RCA | - | 56 | 0 | 2 | 39 | - | - | 20 | 117 | 117 | - | - | 232 | - | - | - | - | - | 9,413 | 690 | - |
| 4b.1.2.66 | Waste Gas Disposal | - | 438 | 43 | 45 | 410 | 464 | - | 298 | 1,699 | 1,699 | - | - | 2,453 | 1,358 | - | - | - | - | 187,339 | 5,879 | - |
| 4b.1.2.67 | Waste Liquid Disposal | - | 1,642 | 116 | 100 | 612 | 1,234 | - | 837 | 4,541 | 4,541 | - | - | 3,655 | 3,594 | - | - | - | - | 381,754 | 22,011 | - |
| 4b.1.2.68 | Waste Solid Disposal | - | 132 | 12 | 11 | 65 | 134 | - | 79 | 433 | 433 | - | - | 389 | 393 | - | - | - | - | 41,177 | 1,781 | - |
| 4b.1.2 | Totals | - | 17,877 | 633 | 1,092 | 17,625 | 5,377 | - | 8,385 | 50,989 | 47,545 | - | 3,444 | 105,339 | 15,761 | - | - | - | - | 5,294,310 | 240,033 | - |
| 4b.1.3 | Scaffolding in support of decommissioning | - | 4,297 | 33 | 15 | 281 | 45 | - | 1,133 | 5,804 | 5,804 | - | - | 1,518 | 134 | - | - | - | - | 76,824 | 35,578 | - |
| Decontamination of Site Buildings | | | | | | | | | | | | | | | | | | | | | | |
| 4b.1.4.1 | Reactor | 1,096 | 2,528 | 240 | 1,236 | 373 | 7,080 | - | 3,215 | 15,768 | 15,768 | - | - | 2,230 | 67,331 | - | - | - | - | 3,286,725 | 45,740 | - |
| 4b.1.4.2 | Auxiliary | 1,168 | 375 | 23 | 117 | 177 | 648 | - | 886 | 3,395 | 3,395 | - | - | 1,060 | 6,118 | - | - | - | - | 332,495 | 21,235 | - |
| 4b.1.4.3 | Backwash Waste Receiving Tank | - | 25 | 3 | 17 | - | 97 | - | 33 | 175 | 175 | - | - | - | 929 | - | - | - | - | 43,896 | 266 | - |
| 4b.1.4.4 | Drum Transfer & Truck Loading Enclosure | - | 8 | 1 | 3 | 3 | 14 | - | 15 | 59 | 59 | - | - | 19 | 135 | - | - | - | - | 7,118 | 328 | - |
| 4b.1.4.5 | LLRW Storage Enclosure | 111 | 48 | 3 | 17 | 6 | 96 | - | 95 | 377 | 377 | - | - | 38 | 920 | - | - | - | - | 44,971 | 2,151 | - |
| 4b.1.4.6 | Radwaste | 50 | 21 | 1 | 8 | 7 | 43 | - | 43 | 174 | 174 | - | - | 42 | 412 | - | - | - | - | 21,136 | 964 | - |
| 4b.1.4.7 | Resin Disposal | 15 | 11 | 1 | 3 | 14 | 14 | - | 16 | 72 | 72 | - | - | 83 | 124 | - | - | - | - | 9,271 | 340 | - |
| 4b.1.4.8 | Fuel Handling of Aux Building | 924 | 1,015 | 13 | 45 | 404 | 195 | - | 833 | 3,430 | 3,430 | - | - | 2,417 | 1,652 | - | - | - | - | 177,755 | 27,145 | - |
| 4b.1.4 | Totals | 3,380 | 4,031 | 285 | 1,445 | 985 | 8,187 | - | 5,137 | 23,450 | 23,450 | - | - | 5,889 | 77,619 | - | - | - | - | 3,923,368 | 98,170 | - |
| 4b.1.5 | Prepare/submit License Termination Plan | - | - | - | - | - | - | 225 | 34 | 259 | 259 | - | - | - | - | - | - | - | - | - | - | 1,751 |
| 4b.1.6 | Receive NRC approval of termination plan | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - | - |
| 4b.1 | Subtotal Period 4b Activity Costs | 3,69 | | | | | | | | | | | | | | | | | | | | |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table J-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours | |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|---------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | | |
| Period 4b Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 4b.2.1 | License Termination Survey Planning | - | - | - | - | - | - | 1,037 | 311 | 1,348 | 1,348 | - | - | - | - | - | - | - | - | - | - | 6,240 |
| 4b.2.2 | Excavation of Underground Services | - | 1,175 | - | - | - | - | 225 | 328 | 1,728 | 1,728 | - | - | - | - | - | - | - | - | - | 7,411 | - |
| 4b.2.3 | Operational Equipment | - | - | 11 | 36 | 606 | - | - | 97 | 751 | 751 | - | - | 5,880 | - | - | - | - | - | 147,000 | 16 | - |
| 4b.2 | Subtotal Period 4b Additional Costs | - | 1,175 | 11 | 36 | 606 | - | 1,262 | 736 | 3,827 | 3,827 | - | - | 5,880 | - | - | - | - | - | 147,000 | 7,427 | 6,240 |
| Period 4b Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 4b.3.1 | Process decommissioning water waste | 7 | - | 12 | 21 | - | 48 | - | 20 | 107 | 107 | - | - | - | 109 | - | - | - | - | 6,547 | 21 | - |
| 4b.3.3 | Small tool allowance | - | 443 | - | - | - | - | - | 66 | 509 | 509 | - | - | - | - | - | - | - | - | - | - | - |
| 4b.3.4 | Decommissioning Equipment Disposition | - | - | 130 | 67 | 1,112 | 178 | - | 234 | 1,722 | 1,722 | - | - | 6,000 | 529 | - | - | - | - | 303,608 | 147 | - |
| 4b.3.5 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 2,225 | - | 2,225 | - | 2,225 | - | - | - | - | - | - | - | - | - | - |
| 4b.3 | Subtotal Period 4b Collateral Costs | 7 | 443 | 142 | 88 | 1,112 | 225 | 2,225 | 320 | 4,563 | 2,338 | 2,225 | - | 6,000 | 638 | - | - | - | - | 310,155 | 168 | - |
| Period 4b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 4b.4.1 | Decon supplies | 1,449 | - | - | - | - | - | - | 362 | 1,811 | 1,811 | - | - | - | - | - | - | - | - | - | - | - |
| 4b.4.2 | Insurance | - | - | - | - | - | - | 862 | 86 | 949 | 949 | - | - | - | - | - | - | - | - | - | - | - |
| 4b.4.3 | Property taxes | - | - | - | - | - | - | 5,715 | 572 | 6,287 | 3,785 | 2,502 | - | - | - | - | - | - | - | - | - | - |
| 4b.4.4 | Health physics supplies | - | 3,213 | - | - | - | - | - | 803 | 4,016 | 4,016 | - | - | - | - | - | - | - | - | - | - | - |
| 4b.4.5 | Heavy equipment rental | - | 4,577 | - | - | - | - | - | 687 | 5,263 | 5,263 | - | - | - | - | - | - | - | - | - | - | - |
| 4b.4.6 | Disposal of DAW generated | - | - | 116 | 47 | - | 482 | - | 139 | 784 | 784 | - | - | - | 5,851 | - | - | - | - | 117,027 | 191 | - |
| 4b.4.7 | Plant energy budget | - | - | - | - | - | 2,165 | - | 325 | 2,490 | 2,490 | - | - | - | - | - | - | - | - | - | - | - |
| 4b.4.8 | NRC ISFSI Fees | - | - | - | - | - | 74 | - | 7 | 81 | - | 81 | - | - | - | - | - | - | - | - | - | - |
| 4b.4.9 | NRC Fees | - | - | - | - | - | 562 | - | 56 | 618 | 618 | - | - | - | - | - | - | - | - | - | - | - |
| 4b.4.10 | Emergency Planning Fees | - | - | - | - | - | 132 | - | 13 | 145 | - | 145 | - | - | - | - | - | - | - | - | - | - |
| 4b.4.11 | Fixed Overhead | - | - | - | - | - | 2,118 | - | 318 | 2,436 | 2,436 | - | - | - | - | - | - | - | - | - | - | - |
| 4b.4.12 | Liquid Radwaste Processing Equipment/Services | - | - | - | - | - | 757 | - | 113 | 870 | 870 | - | - | - | - | - | - | - | - | - | - | - |
| 4b.4.13 | ISFSI Operating Costs | - | - | - | - | - | 100 | - | 15 | 115 | - | 115 | - | - | - | - | - | - | - | - | - | - |
| 4b.4.14 | Railroad Track Maintenance | - | - | - | - | - | 111 | - | 17 | 128 | 128 | - | - | - | - | - | - | - | - | - | - | - |
| 4b.4.15 | Remedial Actions Surveys | - | - | - | - | - | 1,995 | - | 299 | 2,294 | 2,294 | - | - | - | - | - | - | - | - | - | - | - |
| 4b.4.16 | Security Staff Cost | - | - | - | - | - | 10,435 | - | 1,565 | 12,000 | 8,988 | 3,012 | - | - | - | - | - | - | - | - | - | 160,203 |
| 4b.4.17 | DOC Staff Cost | - | - | - | - | - | 22,641 | - | 3,396 | 26,038 | 26,038 | - | - | - | - | - | - | - | - | - | - | 248,175 |
| 4b.4.18 | Utility Staff Cost | - | - | - | - | - | 28,347 | - | 4,252 | 32,600 | 31,361 | 1,239 | - | - | - | - | - | - | - | - | - | 440,789 |
| 4b.4 | Subtotal Period 4b Period-Dependent Costs | 1,449 | 7,790 | 116 | 47 | - | 482 | 76,016 | 13,026 | 98,926 | 91,832 | 7,094 | - | - | 5,851 | - | - | - | - | 117,027 | 191 | 849,167 |
| 4b.0 | TOTAL PERIOD 4b COST | 5,149 | 35,647 | 1,305 | 2,766 | 20,610 | 15,020 | 79,729 | 29,128 | 189,353 | 176,590 | 9,319 | 3,444 | 124,626 | 102,096 | - | - | - | - | 10,001,600 | 382,144 | 857,159 |
| PERIOD 4f - License Termination | | | | | | | | | | | | | | | | | | | | | | |
| Period 4f Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | | |
| 4f.1.1 | ORISE confirmatory survey | - | - | - | - | - | - | 166 | 50 | 216 | 216 | - | - | - | - | - | - | - | - | - | - | - |
| 4f.1.2 | Terminate license | - | - | - | - | - | - | - | - | a | - | - | - | - | - | - | - | - | - | - | - | - |
| 4f.1 | Subtotal Period 4f Activity Costs | - | - | - | - | - | - | 166 | 50 | 216 | 216 | - | - | - | - | - | - | - | - | - | - | - |
| Period 4f Additional Costs | | | | | | | | | | | | | | | | | | | | | | |
| 4f.2.1 | License Termination Survey | - | - | - | - | - | - | 7,041 | 2,112 | 9,154 | 9,154 | - | - | - | - | - | - | - | - | - | 100,895 | 3,120 |
| 4f.2 | Subtotal Period 4f Additional Costs | - | - | - | - | - | - | 7,041 | 2,112 | 9,154 | 9,154 | - | - | - | - | - | - | - | - | - | 100,895 | 3,120 |
| Period 4f Collateral Costs | | | | | | | | | | | | | | | | | | | | | | |
| 4f.3.1 | DOC staff relocation expenses | - | - | - | - | - | - | 1,264 | 190 | 1,454 | 1,454 | - | - | - | - | - | - | - | - | - | - | - |
| 4f.3.2 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 934 | - | 934 | - | 934 | - | - | - | - | - | - | - | - | - | - |
| 4f.3 | Subtotal Period 4f Collateral Costs | - | - | - | - | - | - | 2,198 | 190 | 2,388 | 1,454 | 934 | - | - | - | - | - | - | - | - | - | - |
| Period 4f Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | | |
| 4f.4.1 | Insurance | - | - | - | - | - | - | 362 | 36 | 398 | - | 398 | - | - | - | - | - | - | - | - | - | - |
| 4f.4.2 | Property taxes | - | - | - | - | - | - | 2,306 | 231 | 2,537 | 1,469 | 1,068 | - | - | - | - | - | - | - | - | - | - |
| 4f.4.3 | Health physics supplies | - | 710 | - | - | - | - | - | 178 | 888 | 888 | - | - | - | - | - | - | - | - | - | - | - |
| 4f.4.4 | Disposal of DAW generated | - | - | 7 | 3 | - | 28 | - | 8 | 45 | 45 | - | - | - | 334 | - | - | - | - | 6,685 | 11 | - |
| 4f.4.5 | Plant energy budget | - | - | - | - | - | - | 243 | 36 | 279 | 279 | - | - | - | - | - | - | - | - | - | - | - |
| 4f.4.6 | NRC ISFSI Fees | - | - | - | - | - | - | 31 | 3 | 34 | - | 34 | - | - | - | - | - | - | - | - | - | - |
| 4f.4.7 | NRC Fees | - | - | - | - | - | - | 263 | 26 | 290 | - | 290 | - | - | - | - | - | - | - | - | - | - |
| 4f.4.8 | Emergency Planning Fees | - | - | - | - | - | - | 55 | 6 | 61 | - | 61 | - | - | - | - | - | - | - | - | - | - |
| 4f.4.9 | Fixed Overhead | - | - | - | - | - | - | 890 | 133 | 1,023 | 1,023 | - | - | - | - | - | - | - | - | - | - | - |
| 4f.4.10 | ISFSI Operating Costs | - | - | - | - | - | - | 42 | 6 | 48 | - | 48 | - | - | - | - | - | - | - | - | - | - |
| 4f.4.11 | Railroad Track Maintenance | - | - | - | - | - | - | 47 | 7 | 54 | 54 | - | - | - | - | - | - | - | - | - | - | - |
| 4f.4.12 | Security Staff Cost | - | - | - | - | - | - | 1,835 | 275 | 2,111 | 927 | 1,184 | - | - | - | - | - | - | - | - | - | 27,614 |
| 4f.4.13 | DOC Staff Cost | - | - | - | - | - | - | 4,238 | 636 | 4,874 | 4,874 | - | - | - | - | - | - | - | - | - | - | 46,283 |
| 4f.4.14 | Utility Staff Cost | - | - | - | - | - | - | 4,011 | 602 | 4,613 | 4,175 | 438 | - | - | - | - | - | - | - | - | - | 59,507 |
| 4f.4 | Subtotal Period 4f Period-Dependent Costs | - | 710 | 7 | 3 | - | 28 | 14,324 | 2,183 | 17,254 | 14,022 | 3,232 | - | - | 334 | - | - | - | - | 6,685 | 11 | 133,404 |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table J-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|---|--------------|---------------|-----------------|-----------------|---------------------------|---------------------|----------------|-------------------|----------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| 4f.0 | TOTAL PERIOD 4f COST | - | 710 | 7 | 3 | - | 28 | 23,730 | 4,535 | 29,012 | 24,846 | 4,166 | - | - | 334 | - | - | - | 6,685 | 100,906 | 136,524 |
| PERIOD 4 TOTALS | | 5,395 | 66,639 | 19,159 | 6,333 | 27,115 | 34,036 | 161,545 | 67,737 | 387,961 | 361,874 | 19,681 | 6,405 | 166,102 | 135,824 | 125 | 673 | - | 14,069,470 | 673,447 | 1,616,988 |
| PERIOD 5b - Site Restoration | | | | | | | | | | | | | | | | | | | | | |
| Period 5b Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| Demolition of Remaining Site Buildings | | | | | | | | | | | | | | | | | | | | | |
| 5b.1.1.1 | Reactor | - | 4,645 | - | - | - | - | - | 697 | 5,342 | - | - | 5,342 | - | - | - | - | - | - | 44,679 | - |
| 5b.1.1.2 | Auxiliary | - | 1,993 | - | - | - | - | - | 299 | 2,291 | - | - | 2,291 | - | - | - | - | - | - | 11,902 | - |
| 5b.1.1.3 | Condensate Storage Tank Foundation | - | 7 | - | - | - | - | - | 1 | 8 | - | - | 8 | - | - | - | - | - | - | 33 | - |
| 5b.1.1.4 | Construction Warehouse & Fab Shop | - | 130 | - | - | - | - | - | 19 | 149 | - | - | 149 | - | - | - | - | - | - | 1,405 | - |
| 5b.1.1.5 | D3/D4 Emergency Generator | - | 14 | - | - | - | - | - | 2 | 16 | - | - | 16 | - | - | - | - | - | - | 84 | - |
| 5b.1.1.6 | Drum Transfer & Truck Loading Enclosure | - | 20 | - | - | - | - | - | 3 | 24 | - | - | 24 | - | - | - | - | - | - | 221 | - |
| 5b.1.1.7 | Hydrogen House | - | 6 | - | - | - | - | - | 1 | 7 | - | - | 7 | - | - | - | - | - | - | 47 | - |
| 5b.1.1.8 | LLRW Storage Enclosure | - | 128 | - | - | - | - | - | 19 | 147 | - | - | 147 | - | - | - | - | - | - | 853 | - |
| 5b.1.1.9 | Misc Structures 2017 | - | 2,617 | - | - | - | - | - | 393 | 3,009 | - | - | 3,009 | - | - | - | - | - | - | 22,582 | - |
| 5b.1.1.10 | Radwaste | - | 176 | - | - | - | - | - | 26 | 202 | - | - | 202 | - | - | - | - | - | - | 1,400 | - |
| 5b.1.1.11 | Resin Disposal | - | 14 | - | - | - | - | - | 2 | 16 | - | - | 16 | - | - | - | - | - | - | 120 | - |
| 5b.1.1.12 | Structures below 3' below grade | - | 1,785 | - | - | - | - | - | 268 | 2,052 | - | - | 2,052 | - | - | - | - | - | - | 9,238 | - |
| 5b.1.1.13 | Sulfuric Acid Tank Enclosure | - | 3 | - | - | - | - | - | 0 | 4 | - | - | 4 | - | - | - | - | - | - | 35 | - |
| 5b.1.1.14 | Turbine | - | 2,140 | - | - | - | - | - | 321 | 2,461 | - | - | 2,461 | - | - | - | - | - | - | 21,997 | - |
| 5b.1.1.15 | Turbine Pedestal | - | 365 | - | - | - | - | - | 55 | 420 | - | - | 420 | - | - | - | - | - | - | 1,857 | - |
| 5b.1.1.16 | Warehouse #2 | - | 24 | - | - | - | - | - | 4 | 27 | - | - | 27 | - | - | - | - | - | - | 213 | - |
| 5b.1.1.17 | Waste Neutralizing Tank House | - | 7 | - | - | - | - | - | 1 | 8 | - | - | 8 | - | - | - | - | - | - | 56 | - |
| 5b.1.1.18 | Waste Oil Storage | - | 9 | - | - | - | - | - | 1 | 10 | - | - | 10 | - | - | - | - | - | - | 70 | - |
| 5b.1.1.19 | Water Treatment | - | 324 | - | - | - | - | - | 49 | 373 | - | - | 373 | - | - | - | - | - | - | 2,690 | - |
| 5b.1.1.20 | Fuel Handling of Aux Building | - | 1,095 | - | - | - | - | - | 164 | 1,259 | - | - | 1,259 | - | - | - | - | - | - | 8,240 | - |
| 5b.1.1 | Totals | - | 15,501 | - | - | - | - | - | 2,325 | 17,826 | - | - | 17,826 | - | - | - | - | - | - | 127,723 | - |
| Site Closeout Activities | | | | | | | | | | | | | | | | | | | | | |
| 5b.1.2 | Remove Rubble | - | 1,517 | - | - | - | - | - | 228 | 1,745 | - | - | 1,745 | - | - | - | - | - | - | 7,408 | - |
| 5b.1.3 | Grade & landscape site | - | 448 | - | - | - | - | - | 67 | 515 | - | - | 515 | - | - | - | - | - | - | 921 | - |
| 5b.1.4 | Final report to NRC | - | - | - | - | - | - | 86 | 13 | 99 | 99 | - | - | - | - | - | - | - | - | - | 667 |
| 5b.1 | Subtotal Period 5b Activity Costs | - | 17,466 | - | - | - | - | 86 | 2,633 | 20,185 | 99 | - | 20,086 | - | - | - | - | - | - | 136,051 | 667 |
| Period 5b Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 5b.2.1 | Clean Concrete Disposal | - | 4,912 | - | - | - | - | 10 | 738 | 5,660 | - | - | 5,660 | - | - | - | - | - | - | 18,372 | - |
| 5b.2.2 | Intake Structure Cofferdam | - | 442 | - | - | - | - | - | 66 | 508 | - | - | 508 | - | - | - | - | - | - | 3,552 | - |
| 5b.2.3 | Construction Debris | - | - | - | - | - | - | 2,150 | 323 | 2,473 | - | - | 2,473 | - | - | - | - | - | - | - | - |
| 5b.2.4 | Backfill | - | 9,257 | - | - | - | - | - | 1,388 | 10,645 | - | - | 10,645 | - | - | - | - | - | - | 9,327 | - |
| 5b.2.5 | Disposition of Original Casks | - | 24 | 80 | 418 | - | 2,390 | - | 728 | 3,640 | 3,640 | - | - | - | 8,929 | - | - | - | 1,059,612 | 146 | - |
| 5b.2 | Subtotal Period 5b Additional Costs | - | 14,634 | 80 | 418 | - | 2,390 | 2,160 | 3,244 | 22,926 | 3,640 | - | 19,286 | - | 8,929 | - | - | - | 1,059,612 | 31,397 | - |
| Period 5b Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 5b.3.1 | Small tool allowance | - | 213 | - | - | - | - | - | 32 | 245 | - | - | 245 | - | - | - | - | - | - | - | - |
| 5b.3.2 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 3,821 | 573 | 4,394 | - | 4,394 | - | - | - | - | - | - | - | - | - |
| 5b.3.3 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 2,649 | - | 2,649 | - | 2,649 | - | - | - | - | - | - | - | - | - |
| 5b.3 | Subtotal Period 5b Collateral Costs | - | 213 | - | - | - | - | 6,470 | 605 | 7,288 | - | 7,043 | 245 | - | - | - | - | - | - | - | - |
| Period 5b Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 5b.4.1 | Insurance | - | - | - | - | - | - | 513 | 51 | 565 | - | 565 | - | - | - | - | - | - | - | - | - |
| 5b.4.2 | Property taxes | - | - | - | - | - | - | 5,904 | 590 | 6,494 | - | 2,663 | 3,831 | - | - | - | - | - | - | - | - |
| 5b.4.3 | Heavy equipment rental | - | 7,144 | - | - | - | - | - | 1,072 | 8,215 | - | - | 8,215 | - | - | - | - | - | - | - | - |
| 5b.4.4 | Plant energy budget | - | - | - | - | - | - | 344 | 52 | 395 | - | 395 | - | - | - | - | - | - | - | - | - |
| 5b.4.5 | NRC ISFSI Fees | - | - | - | - | - | - | 243 | 24 | 268 | - | 268 | - | - | - | - | - | - | - | - | - |
| 5b.4.6 | Emergency Planning Fees | - | - | - | - | - | - | 157 | 16 | 173 | - | 173 | - | - | - | - | - | - | - | - | - |
| 5b.4.7 | Fixed Overhead | - | - | - | - | - | - | 1,024 | 154 | 1,178 | - | 781 | 397 | - | - | - | - | - | - | - | - |
| 5b.4.8 | ISFSI Operating Costs | - | - | - | - | - | - | 119 | 18 | 136 | - | 136 | - | - | - | - | - | - | - | - | - |
| 5b.4.9 | Railroad Track Maintenance | - | - | - | - | - | - | 133 | 20 | 152 | (0) | 97 | 56 | - | - | - | - | - | - | - | - |
| 5b.4.10 | Security Staff Cost | - | - | - | - | - | - | 4,976 | 746 | 5,722 | 0 | 5,310 | 412 | - | - | - | - | - | - | - | 74,431 |
| 5b.4.11 | DOC Staff Cost | - | - | - | - | - | - | 10,921 | 1,638 | 12,559 | - | - | 12,559 | - | - | - | - | - | - | - | 116,885 |
| 5b.4.12 | Utility Staff Cost | - | - | - | - | - | - | 5,170 | 776 | 5,946 | - | 1,278 | 4,668 | - | - | - | - | - | - | - | 76,637 |
| 5b.4 | Subtotal Period 5b Period-Dependent Costs | - | 7,144 | - | - | - | - | 29,504 | 5,156 | 41,804 | 0 | 11,666 | 30,139 | - | - | - | - | - | - | - | 267,952 |
| 5b.0 | TOTAL PERIOD 5b COST | - | 39,457 | 80 | 418 | - | 2,390 | 38,220 | 11,638 | 92,203 | 3,739 | 18,708 | 69,756 | - | 8,929 | - | - | - | 1,059,612 | 167,448 | 268,620 |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table J-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | GTCC Cu. Feet | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | | | | |
| PERIOD 5c - Fuel Storage Operations/Shipping | | | | | | | | | | | | | | | | | | | | | |
| Period 5c Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| Period 5c Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 5c.3.1 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 445,840 | 66,876 | 512,716 | - | 512,716 | - | - | - | - | - | - | - | - | - |
| 5c.3.2 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 152,793 | - | 152,793 | - | 152,793 | - | - | - | - | - | - | - | - | - |
| 5c.3 | Subtotal Period 5c Collateral Costs | - | - | - | - | - | - | 598,632 | 66,876 | 665,508 | - | 665,508 | - | - | - | - | - | - | - | - | - |
| Period 5c Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 5c.4.1 | Insurance | - | - | - | - | - | - | 29,616 | 2,962 | 32,578 | - | 32,578 | - | - | - | - | - | - | - | - | - |
| 5c.4.2 | Property taxes | - | - | - | - | - | - | 169,412 | 16,941 | 186,354 | - | 186,354 | - | - | - | - | - | - | - | - | - |
| 5c.4.4 | NRC ISFSI Fees | - | - | - | - | - | - | 14,030 | 1,403 | 15,432 | - | 15,432 | - | - | - | - | - | - | - | - | - |
| 5c.4.5 | Emergency Planning Fees | - | - | - | - | - | - | 9,068 | 907 | 9,974 | - | 9,974 | - | - | - | - | - | - | - | - | - |
| 5c.4.6 | Fixed Overhead | - | - | - | - | - | - | 19,930 | 2,990 | 22,920 | - | 22,920 | - | - | - | - | - | - | - | - | - |
| 5c.4.7 | ISFSI Operating Costs | - | - | - | - | - | - | 6,845 | 1,027 | 7,872 | - | 7,872 | - | - | - | - | - | - | - | - | - |
| 5c.4.8 | Railroad Track Maintenance | - | - | - | - | - | - | 7,647 | 1,147 | 8,795 | - | 8,795 | - | - | - | - | - | - | - | - | - |
| 5c.4.9 | Security Staff Cost | - | - | - | - | - | - | 236,347 | 35,452 | 271,799 | - | 271,799 | - | - | - | - | - | - | - | - | 3,434,684 |
| 5c.4.10 | DOC Staff Cost | - | - | - | - | - | - | 18,749 | 2,812 | 21,561 | - | 21,561 | - | - | - | - | - | - | - | - | 127,211 |
| 5c.4.11 | Utility Staff Cost | - | - | - | - | - | - | 115,440 | 17,316 | 132,756 | - | 132,756 | - | - | - | - | - | - | - | - | 1,685,540 |
| 5c.4 | Subtotal Period 5c Period-Dependent Costs | - | - | - | - | - | - | 627,085 | 82,956 | 710,041 | - | 710,041 | - | - | - | - | - | - | - | - | 5,247,434 |
| 5c.0 | TOTAL PERIOD 5c COST | - | - | - | - | - | - | 1,225,717 | 149,832 | 1,375,549 | - | 1,375,549 | - | - | - | - | - | - | - | - | 5,247,434 |
| PERIOD 5d - GTCC shipping | | | | | | | | | | | | | | | | | | | | | |
| Period 5d Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| Nuclear Steam Supply System Removal | | | | | | | | | | | | | | | | | | | | | |
| 5d.1.1.1 | Vessel & Internals GTCC Disposal | - | - | 1,444 | - | - | 8,680 | - | 1,663 | 11,787 | 11,787 | - | - | - | - | - | - | 1,773 | 344,823 | - | - |
| 5d.1.1 | Totals | - | - | 1,444 | - | - | 8,680 | - | 1,663 | 11,787 | 11,787 | - | - | - | - | - | - | 1,773 | 344,823 | - | - |
| 5d.1 | Subtotal Period 5d Activity Costs | - | - | 1,444 | - | - | 8,680 | - | 1,663 | 11,787 | 11,787 | - | - | - | - | - | - | 1,773 | 344,823 | - | - |
| Period 5d Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 5d.3.1 | Spent Fuel Capital and Transfer | - | - | - | - | - | - | 28 | 4 | 32 | - | 32 | - | - | - | - | - | - | - | - | - |
| 5d.3.2 | Prairie Island Indian Community Payments | - | - | - | - | - | - | 48 | - | 48 | - | 48 | - | - | - | - | - | - | - | - | - |
| 5d.3 | Subtotal Period 5d Collateral Costs | - | - | - | - | - | - | 76 | 4 | 80 | - | 80 | - | - | - | - | - | - | - | - | - |
| Period 5d Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 5d.4.1 | Insurance | - | - | - | - | - | - | 9 | 1 | 10 | 10 | - | - | - | - | - | - | - | - | - | - |
| 5d.4.2 | Property taxes | - | - | - | - | - | - | 53 | 5 | 58 | 58 | - | - | - | - | - | - | - | - | - | - |
| 5d.4.4 | NRC ISFSI Fees | - | - | - | - | - | - | 4 | 0 | 4 | - | 4 | - | - | - | - | - | - | - | - | - |
| 5d.4.5 | Emergency Planning Fees | - | - | - | - | - | - | 3 | 0 | 3 | - | 3 | - | - | - | - | - | - | - | - | - |
| 5d.4.6 | Fixed Overhead | - | - | - | - | - | - | 6 | 1 | 7 | - | 7 | - | - | - | - | - | - | - | - | - |
| 5d.4.7 | Railroad Track Maintenance | - | - | - | - | - | - | 2 | 0 | 3 | - | 3 | - | - | - | - | - | - | - | - | - |
| 5d.4.8 | Security Staff Cost | - | - | - | - | - | - | 74 | 11 | 85 | 85 | - | - | - | - | - | - | - | - | - | 1,077 |
| 5d.4.9 | Utility Staff Cost | - | - | - | - | - | - | 19 | 3 | 22 | 22 | - | - | - | - | - | - | - | - | - | 269 |
| 5d.4 | Subtotal Period 5d Period-Dependent Costs | - | - | - | - | - | - | 171 | 22 | 194 | 186 | 7 | - | - | - | - | - | - | - | - | 1,346 |
| 5d.0 | TOTAL PERIOD 5d COST | - | - | 1,444 | - | - | 8,680 | 247 | 1,689 | 12,060 | 11,973 | 87 | - | - | - | - | - | 1,773 | 344,823 | - | 1,346 |
| PERIOD 5e - ISFSI Decontamination | | | | | | | | | | | | | | | | | | | | | |
| Period 5e Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| Period 5e Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 5e.2.1 | License Termination ISFSI | - | 0 | 2 | 17 | - | 142 | 1,197 | 339 | 1,696 | 1,696 | - | - | - | 424 | - | - | - | 65,754 | 5,882 | 1,161 |
| 5e.2 | Subtotal Period 5e Additional Costs | - | 0 | 2 | 17 | - | 142 | 1,197 | 339 | 1,696 | 1,696 | - | - | - | 424 | - | - | - | 65,754 | 5,882 | 1,161 |
| Period 5e Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 5e.4.1 | Insurance | - | - | - | - | - | - | 93 | 23 | 116 | 116 | - | - | - | - | - | - | - | - | - | - |
| 5e.4.2 | Property taxes | - | - | - | - | - | - | 56 | 14 | 69 | 69 | - | - | - | - | - | - | - | - | - | - |
| 5e.4.3 | Plant energy budget | - | - | - | - | - | - | 11 | 3 | 13 | 13 | - | - | - | - | - | - | - | - | - | - |
| 5e.4.4 | Fixed Overhead | - | - | - | - | - | - | 54 | 14 | 68 | 68 | - | - | - | - | - | - | - | - | - | - |
| 5e.4.5 | Railroad Track Maintenance | - | - | - | - | - | - | 21 | 5 | 26 | 26 | - | - | - | - | - | - | - | - | - | - |
| 5e.4.6 | Security Staff Cost | - | - | - | - | - | - | 174 | 43 | 217 | 217 | - | - | - | - | - | - | - | - | - | 2,500 |
| 5e.4.7 | Utility Staff Cost | - | - | - | - | - | - | 129 | 32 | 161 | 161 | - | - | - | - | - | - | - | - | - | 1,896 |
| 5e.4 | Subtotal Period 5e Period-Dependent Costs | - | - | - | - | - | - | 536 | 134 | 670 | 670 | - | - | - | - | - | - | - | - | - | 4,396 |

**Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis**

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**Table J-2
Prairie Island SAFSTOR Unit 2
SAFSTOR Decommissioning Cost Estimate with 200 Years of Spent Fuel Storage
(Thousands of 2020 Dollars)**

| Activity Index | Activity Description | Decon Cost | Removal Cost | Packaging Costs | Transport Costs | Off-Site Processing Costs | LLRW Disposal Costs | Other Costs | Total Contingency | Total Costs | NRC Lic. Term. Costs | Spent Fuel Management Costs | Site Restoration Costs | Processed Volume Cu. Feet | Burial Volumes | | | | Burial / Processed Wt., Lbs. | Craft Manhours | Utility and Contractor Manhours |
|---|---|------------|--------------|-----------------|-----------------|---------------------------|---------------------|-------------|-------------------|-------------|----------------------|-----------------------------|------------------------|---------------------------|------------------|------------------|------------------|---------------|------------------------------|----------------|---------------------------------|
| | | | | | | | | | | | | | | | Class A Cu. Feet | Class B Cu. Feet | Class C Cu. Feet | GTCC Cu. Feet | | | |
| 5e.0 | TOTAL PERIOD 5e COST | - | 0 | 2 | 17 | - | 142 | 1,733 | 473 | 2,367 | 2,367 | - | - | - | 424 | - | - | - | 65,754 | 5,882 | 5,556 |
| PERIOD 5f - ISFSI Site Restoration | | | | | | | | | | | | | | | | | | | | | |
| Period 5f Direct Decommissioning Activities | | | | | | | | | | | | | | | | | | | | | |
| Period 5f Additional Costs | | | | | | | | | | | | | | | | | | | | | |
| 5f.2.1 | Demolition and Site Restoration of ISFSI | - | 1,121 | - | - | - | - | 161 | 192 | 1,474 | - | - | 1,474 | - | - | - | - | - | - | 4,846 | 80 |
| 5f.2 | Subtotal Period 5f Additional Costs | - | 1,121 | - | - | - | - | 161 | 192 | 1,474 | - | - | 1,474 | - | - | - | - | - | - | 4,846 | 80 |
| Period 5f Collateral Costs | | | | | | | | | | | | | | | | | | | | | |
| 5f.3.1 | Small tool allowance | - | 7 | - | - | - | - | - | 1 | 8 | - | - | 8 | - | - | - | - | - | - | - | - |
| 5f.3 | Subtotal Period 5f Collateral Costs | - | 7 | - | - | - | - | - | 1 | 8 | - | - | 8 | - | - | - | - | - | - | - | - |
| Period 5f Period-Dependent Costs | | | | | | | | | | | | | | | | | | | | | |
| 5f.4.2 | Property taxes | - | - | - | - | - | - | 28 | 3 | 31 | - | - | 31 | - | - | - | - | - | - | - | - |
| 5f.4.3 | Heavy equipment rental | - | 59 | - | - | - | - | - | 9 | 68 | - | - | 68 | - | - | - | - | - | - | - | - |
| 5f.4.4 | Plant energy budget | - | - | - | - | - | - | 6 | 1 | 6 | - | - | 6 | - | - | - | - | - | - | - | - |
| 5f.4.5 | Fixed Overhead | - | - | - | - | - | - | 28 | 4 | 32 | - | - | 32 | - | - | - | - | - | - | - | - |
| 5f.4.6 | Railroad Track Maintenance | - | - | - | - | - | - | 11 | 2 | 12 | - | - | 12 | - | - | - | - | - | - | - | - |
| 5f.4.7 | Security Staff Cost | - | - | - | - | - | - | 89 | 13 | 102 | - | - | 102 | - | - | - | - | - | - | - | 1,281 |
| 5f.4.8 | Utility Staff Cost | - | - | - | - | - | - | 55 | 8 | 63 | - | - | 63 | - | - | - | - | - | - | - | 795 |
| 5f.4 | Subtotal Period 5f Period-Dependent Costs | - | 59 | - | - | - | - | 216 | 40 | 315 | - | - | 315 | - | - | - | - | - | - | - | 2,076 |
| 5f.0 | TOTAL PERIOD 5f COST | - | 1,187 | - | - | - | - | 377 | 233 | 1,798 | - | - | 1,798 | - | - | - | - | - | - | 4,846 | 2,156 |
| PERIOD 5 TOTALS | | - | 40,644 | 1,525 | 435 | - | 11,212 | 1,266,294 | 163,866 | 1,483,976 | 18,078 | 1,394,345 | 71,553 | - | 9,353 | - | - | 1,773 | 1,470,189 | 178,175 | 5,525,112 |
| TOTAL COST TO DECOMMISSION | | 12,610 | 122,384 | 21,327 | 7,312 | 27,293 | 47,794 | 2,404,684 | 363,115 | 3,006,518 | 983,908 | 1,943,956 | 78,655 | 172,234 | 167,056 | 125 | 673 | 1,773 | 16,288,180 | 950,825 | 11,722,100 |

| | | |
|--|--------------------|----------------------------------|
| TOTAL COST TO DECOMMISSION WITH 13.74% CONTINGENCY: | \$3,006,518 | thousands of 2020 dollars |
| TOTAL NRC LICENSE TERMINATION COST IS 32.73% OR: | \$983,908 | thousands of 2020 dollars |
| SPENT FUEL MANAGEMENT COST IS 64.66% OR: | \$1,943,956 | thousands of 2020 dollars |
| NON-NUCLEAR DEMOLITION COST IS 2.62% OR: | \$78,655 | thousands of 2020 dollars |
| TOTAL LOW-LEVEL RADIOACTIVE WASTE VOLUME BURIED (EXCLUDING GTCC): | 167,854 | Cubic Feet |
| TOTAL GREATER THAN CLASS C RADWASTE VOLUME GENERATED: | 1,773 | Cubic Feet |
| TOTAL SCRAP METAL REMOVED: | 42,406 | Tons |
| TOTAL CRAFT LABOR REQUIREMENTS: | 950,825 | Man-hours |

End Notes:
n/a - indicates that this activity not charged as decommissioning expense
a - indicates that this activity performed by decommissioning staff
0 - indicates that this value is less than 0.5 but is non-zero
A cell containing " - " indicates a zero value

***Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis***

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APPENDIX K

ISFSI DECOMMISSIONING

| | <u>Page</u> |
|--|-------------|
| Prairie Island Nuclear Generating Plant – Scenarios 1, 2, 5, and 6 | K-2 |
| Prairie Island Nuclear Generating Plant – Scenarios 3, 4, 7, and 8 | K-3 |

*Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis*

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Table K-1
Prarie Island Nuclear Generating Plant
Scenarios 1, 2, 5, & 6
ISFSI Decommissioning Cost Estimate
(thousands of 2020 dollars)

| Activity Description | Removal Costs | Packaging Costs | Transport Costs | LLRW Disposal Costs | Other Costs | Total Costs | Burial Volume Class A (cubic feet) | Craft Manhours | Oversight and Contractor Manhours |
|---|----------------------|------------------------|------------------------|----------------------------|--------------------|--------------------|---|-----------------------|--|
| Decommissioning Contractor | | | | | | | | | |
| Planning (characterization, specs and procedures) | - | - | - | - | 189 | 189 | - | - | 976 |
| Decontamination (activated disposition) | 49 | 163 | 870 | 5,065 | - | 6,146 | 18,710 | 321 | - |
| License Termination (radiological surveys) | - | - | - | - | 1,020 | 1,020 | - | 7,203 | - |
| Subtotal | 49 | 163 | 870 | 5,065 | 1,209 | 7,355 | 18,710 | 7,524 | 976 |
| Supporting Costs | | | | | | | | | |
| NRC and NRC Contractor Fees and Costs | - | - | - | - | 469 | 469 | - | - | 1,153 |
| Insurance | - | - | - | - | 185 | 185 | - | - | - |
| Property taxes | - | - | - | - | 111 | 111 | - | - | - |
| Plant energy budget | - | - | - | - | 21 | 21 | - | - | - |
| Fixed Overhead | - | - | - | - | 108 | 108 | - | - | - |
| Railroad Track Maintenance | - | - | - | - | 41 | 41 | - | - | - |
| Security Staff Cost | - | - | - | - | 348 | 348 | - | - | 4,999 |
| Utility Staff Cost | - | - | - | - | 258 | 258 | - | - | 3,792 |
| Subtotal | - | - | - | - | 1,541 | 1,541 | - | - | 9,945 |
| Total (w/o contingency) | 49 | 163 | 870 | 5,065 | 2,751 | 8,896 | 18,710 | 7,524 | 10,921 |
| Total (w/25% contingency) | 61 | 204 | 1,087 | 6,331 | 3,438 | 11,121 | | | |

The application of contingency (25%) is consistent with the evaluation criteria referenced by the NRC in NUREG-1757 ("Consolidated Decommissioning Guidance, Financial Assurance, Recordkeeping, and Timeliness," U.S. NRC's Office of Nuclear Material Safety and Safeguards, NUREG-1757, Vol. 3, Rev. 1, February 2012)

*Prairie Island Nuclear Generating Plant
Decommissioning Cost Analysis*

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Table K-2
Prarie Island Nuclear Generating Plant
Scenarios 3, 4, 7, & 8
ISFSI Decommissioning Cost Estimate
(thousands of 2020 dollars)

| Activity Description | Removal Costs | Packaging Costs | Transport Costs | LLRW Disposal Costs | Other Costs | Total Costs | Burial Volume Class A (cubic feet) | Craft Manhours | Oversight and Contractor Manhours |
|---|---------------|-----------------|-----------------|---------------------|--------------|--------------|------------------------------------|----------------|-----------------------------------|
| Decommissioning Contractor | | | | | | | | | |
| Planning (characterization, specs and procedures) | - | - | - | - | 299 | 299 | - | - | 1,168 |
| Decontamination (activated disposition) | 0 | 3 | 33 | 283 | - | 320 | 848 | 29 | - |
| License Termination (radiological surveys) | - | - | - | - | 1,619 | 1,619 | - | 11,734 | - |
| Subtotal | 0 | 3 | 33 | 283 | 1,918 | 2,238 | 848 | 11,763 | 1,168 |
| Supporting Costs | | | | | | | | | |
| NRC and NRC Contractor Fees and Costs | - | - | - | - | 476 | 476 | - | - | 1,153 |
| Insurance | - | - | - | - | 185 | 185 | - | - | - |
| Property taxes | - | - | - | - | 111 | 111 | - | - | - |
| Plant energy budget | - | - | - | - | 21 | 21 | - | - | - |
| Fixed Overhead | - | - | - | - | 108 | 108 | - | - | - |
| Railroad Track Maintenance | - | - | - | - | 41 | 41 | - | - | - |
| Security Staff Cost | - | - | - | - | 348 | 348 | - | - | 4,999 |
| Utility Staff Cost | - | - | - | - | 258 | 258 | - | - | 3,792 |
| Subtotal | - | - | - | - | 1,549 | 1,549 | - | - | 9,945 |
| Total (w/o contingency) | 0 | 3 | 33 | 283 | 3,467 | 3,787 | 848 | 11,763 | 11,113 |
| Total (w/25% contingency) | 0 | 4 | 41 | 354 | 4,333 | 4,733 | | | |

The application of contingency (25%) is consistent with the evaluation criteria referenced by the NRC in NUREG-1757 ("Consolidated Decommissioning Guidance, Financial Assurance, Recordkeeping, and Timeliness," U.S. NRC's Office of Nuclear Material Safety and Safeguards, NUREG-1757, Vol. 3, Rev. 1, February 2012)

ENCLOSURE 5

APRIL 2021 MPUC ORDER APPROVING TRUE-UPS

27 pages follow

BEFORE THE MINNESOTA PUBLIC UTILITIES COMMISSION

| | |
|--------------------|--------------|
| Katie J. Sieben | Chair |
| Valerie Means | Commissioner |
| Matthew Schuerger | Commissioner |
| Joseph K. Sullivan | Commissioner |
| John A. Tuma | Commissioner |

In the Matter of the Petition of Northern States
Power Company d/b/a Xcel Energy for Approval
of 2021 True-Up Mechanisms

ISSUE DATE: April 2, 2021

DOCKET NO. E-002/M-20-743

ORDER APPROVING TRUE-UPS
WITH MODIFICATIONS AND
REQUIRING XCEL TO WITHDRAW
ITS NOTICE OF CHANGE IN RATES
AND INTERIM RATE PETITION

PROCEDURAL HISTORY

On November 2, 2020, Northern States Power Company d/b/a Xcel Energy (Xcel or the Company) filed a multiyear general rate case (the Rate Case and Interim Rates Petition) under Minn. Stat. § 216B.16, subd. 19.¹ The Company sought rate increases of \$405.8 million, or 13.2% in 2021 (the test year); an incremental rate increase of \$98.5 million, or 3.3% in 2022; and another incremental rate increase of \$93.1 million, or 3.2% in 2023, together with a proposed interim rate schedule.

Prior to filing the Rate Case and Interim Rates Petition, Xcel filed, on September 16, 2020, a petition (the Stay Out Proposal)² seeking approval to maintain its existing base rates, which if approved, would extend the three true-up mechanisms originally approved as part of the Stipulation of Settlement in Xcel's previous rate case³ and subsequently approved by the Commission in 2020.⁴ The Company stated that if the Commission approved the Stay Out Proposal it would withdraw its general rate case filing.

¹ *In the Matter of the Application of Northern States Power Company for Authority to Increase Rates for Electric Service in the State of Minnesota*, Docket No. E-002/GR-20-723 (the General Rate Case Docket).

² The petition was initially filed in Docket Nos. E,G-999/CI-20-492 and E,G-002/M-20-716, but the Company subsequently re-filed its initial petition on October 1, 2020, in this docket for separate consideration of the Stay Out Proposal.

³ *See In the Matter of the Application of Northern States Power Company for Authority to Increase Rates for Electric Service in the State of Minnesota*, Docket No. E-002/GR-15-826, Findings of Fact, Conclusions, and Order (June 12, 2017) (Xcel's 2015 multiyear rate plan, or MYRP).

⁴ *In the Matter of Northern States Power Company d/b/a Xcel Energy for Approval of True-Up Mechanisms*, Docket No. E-002/M-19-688, Order Approving True-Ups and Requiring Xcel to Withdraw Its Notice of Change in Rates and Interim Rates Petition (March 13, 2020).

On September 24, 2020 the Commission issued a notice requesting comments on the following topics:

- Should the Commission approve Xcel's proposed 2021 sales true-up that, as proposed, would operate similarly to the currently-approved 2020 sales true-up?
- What benchmark (or amount of baseline sales) should the 2021 sales true-up be compared against?
- Should the Commission approve Xcel's proposed 2021 capital true-up that, as proposed, would operate consistently with the current capital true-up established in Xcel's 2015 MYRP?
- What benchmark (or amount of baseline capital projects revenue requirement) should the 2021 capital true-up be compared against?
- Should the Commission approve Xcel's proposed 2021 property tax true-up that, as proposed, would operate consistently with the current property tax true-up established in Xcel's 2015 MYRP?
- Should the Commission approve Xcel's request to delay currently required and any other changes to the Nuclear Decommissioning Trust (NDT) and end-of-life (EOL) nuclear fuel accruals until January 1, 2022?
- How would Xcel's 2021 true-ups proposed in this docket, be reconciled with amounts that will be recovered in all other currently active COVID-19 related proceedings?
- Are the rate mitigation measures and other consumer safeguards proposed by Xcel in this filing adequate and how do they fit in with the other currently active COVID-19 related filings and proposals?
- If the true-ups are approved, how long should it be before Xcel may file its next electric rate case?
- Are there any other issues or concerns related to this matter?

By October 30, 2020, the Commission received comments or reply comments on the Stay Out Proposal from the following:

- Xcel Large Industrials (XLI)⁵
- The Department of Commerce, Division of Energy Resources (the Department)

⁵ XLI is an ad hoc association of large industrial customers of Xcel that includes: Flint Hills Resources Pine Bend, LLC; Marathon Petroleum Corporation; and USG Interiors, Inc.

- Minnesota Energy Consumers (MEC)⁶
- Office of the Attorney General—Residential Utilities Division (the OAG)
- Laborers’ International Union of North America (LIUNA)
- The Commercial Group⁷
- Xcel

On November 4, 2020, the Commission issued an additional notice requesting comments on the following topics:

- Should the Commission approve a sales true-up mechanism as proposed by Xcel or should approval be contingent on Xcel accepting modifications?
- Is there sufficient information provided in Xcel’s October 30, 2020 reply comments to approve Xcel’s proposed capital true-up or should approval be contingent on Xcel accepting modifications?
- Should the Commission approve Xcel’s property tax true-up as proposed or should approval be contingent on Xcel accepting modifications?
- Should the Commission approve Xcel’s request to delay until January 1, 2022 currently required and any other changes to the Nuclear Decommissioning Trust (NDT) and end-of-life (EOL) nuclear fuel accruals?
- Should Xcel’s proposals be considered a continuation of its 2015 Multi-Year Rate Plan (MYRP) and, if so, would Commission approval of the proposed 2021 true-up mechanisms conflict with the five-year limit on MYRPs in the MYRP statute?

By November 17, 2020, the Commission received comments or reply comments in response to the Commission’s notice from the following:

- MEC
- XLI
- The OAG
- The Commercial Group
- The Department
- Energy CENTS Coalition (Energy CENTS)
- LIUNA

⁶ MEC is an ad hoc group of a few of Xcel’s large commercial and industrial customers, including the Chamber of Commerce.

⁷ The Commercial Group is an ad hoc consortium of large commercial customers. Walmart, Inc. participated on behalf of the Group.

- Xcel
- The Suburban Rate Authority (SRA)

On December 4 and 9, 2020, Xcel filed modifications to its Stay Out Proposal.

On December 8, 9, and 17, 2020, the Commission met to consider the matter. At the Commission meeting, Xcel requested that the proposed rates in its General Rate Case Docket be suspended, and that consideration of the proposed interim rate schedule be stayed, pending resolution of the Stay Out Proposal.

On December 30, 2020, the Commission issued an order in the Company's General Rate Case Docket suspending the Company's rates and staying its rate petition pending a final Commission determination.

FINDINGS AND CONCLUSIONS

I. Summary of Commission Action

In this order, the Commission will approve Xcel's Stay Out Proposal on the condition that Xcel withdraws its Rate Case and Interim Rates Petition and does not implement the rates set forth in that petition. The Commission will also establish other related requirements to effectuate the purpose of the Stay Out Proposal, which is to take up the matter of an Xcel general rate proceeding no sooner than November 1, 2021, while maintaining just and reasonable base rates as established in Xcel's last general rate proceeding.

II. Xcel's Stay Out Proposal

Xcel's petition requests that the Commission approve a one-year extension of three true-up mechanisms and a delay in any increase to its Nuclear Decommissioning Trust (NDT) as follows:

- A 2021 sales true-up that would operate in the same manner as the currently approved sales true-up established in the 2020 Stay Out Docket;⁸
- A 2021 capital true-up that would operate in the same manner as the current capital true-up established in the MYRP Docket and approved again in the 2020 Stay Out Docket;
- A 2021 property tax true-up that would operate in the same manner as the current property tax true-up established in the MYRP Docket and approved again in the 2020 Stay Out Docket; and

⁸ *In the Matter of Northern States Power Company d/b/a Xcel Energy for Approval of True-Up Mechanisms*, Docket No. E-002/M-19-688, Order Approving True-Ups and Requiring Xcel to Withdraw Its Notice of Change in Rates and Interim Rates Petition (March 13, 2020).

- Delay any increase to the NDT accrual until January 1, 2022 or, alternatively, approve deferral of the increase so the Company can fund the increased accrual in 2021 and recover that increase in a future rate case.

Xcel's proposal would continue its three true-ups through 2021 similar to the manner in which the Commission authorized Xcel to continue its true-ups through 2020. Xcel had sought to either continue the true-ups, or in the alternative, proceed with a general rate case. In this case, the Company makes a similar request to either continue the true-ups through 2021, or in the alternative, proceed with its Rate Case Docket.

According to Xcel, continuation of the true-ups through 2021 would enable the Company to defer the ratepayer impact of an immediate interim rate increase as requested in Docket No. E-002/GR-20-723, an outcome that the Company said best protects ratepayers, particularly under the current economic strain caused by the COVID-19 pandemic.

Xcel stated that the decision to continue the true-ups would not alter the Company's base rates and would shift some of the risk of avoiding a rate case to the Company, while maintaining just and reasonable rates that reflect the Company's cost of service. The Company also stated that rates authorized under the Stay Out Proposal would be lower than the interim rates the Company otherwise proposes to implement in its general rate case filing.

A. The Sales True-Up

Xcel's current rates include a sales true-up mechanism, which operates in a similar manner to revenue decoupling, a regulatory tool designed to sever the link between sales and revenues.⁹ Under decoupling, the utility recovers the revenue requirement established in a rate case even if the sales forecast over- or underestimates actual sales. The purpose of this tool is to reduce a utility's disincentive to promote energy efficiency.¹⁰

In approving Xcel's request to continue its sales true-up through 2020, the Commission authorized the Company to apply the true-up to all customers in a manner consistent with the true-up established as part of a settlement approved in the Company's 2015 multiyear rate plan.¹¹ Xcel's current Stay Out Proposal requests that the Commission authorize the Company to again continue its sales true-up in similar fashion to the sales true-up currently in place, and as follows:

1. Forecasted base revenues for 2019 will be calculated using 2016 weather-normalized actual sales by class and current base rates (effective June 1, 2019, including reduction

⁹ *In the Matter of the Application of Northern States Power Company for Authority to Increase Rates for Electric Service in the State of Minnesota*, Docket No. E-002/GR-15-826, Findings of Fact, Conclusions, and Order (June 12, 2017) (Xcel's 2015 multiyear rate plan). This decision applied a sales true-up mechanism to demand-metered commercial and industrial customers not already subject to a sales true-up or similar decoupling mechanism.

¹⁰ Minn. Stat. § 216B.2412.

¹¹ The Commission's 2020 approval of Xcel's true-ups authorized the Company to apply the sales true-up to all customers, which allowed the true-up to apply to customer classes whose rates were previously subject to an expiring decoupling mechanism or functionally equivalent sales true-up approved in the Company's 2015 multiyear rate plan.

for a 2017 federal tax reduction). This is the same baseline revenue level as used for the 2019 and 2020 sales true-up measurements.

2. Actual revenues for 2021 will be calculated using 2021 actual customer counts and actual sales and current base rates (effective June 1, 2019, including reduction for TCJA¹²).
3. The 2021 revenue comparison will include the same Commercial and Industrial (C&I) sales growth as assumed in 2018, 2019 and 2020.
4. Any over/under collections from the 2020 sales true-up mechanism will be included with the 2021 results.
5. The true up will include all discounts and incentive rates approved by the Commission.
6. After 2021 actual sales are available in January 2022, the Company will provide the actual 2021 customer counts, sales, and resulting revenues by class for all classes in a compliance filing consistent with the method used in Docket No. E-002/GR-15-826, to be filed February 1, 2022.
7. If the 2021 revenues are greater than the approved plan year level, the difference will be deferred as a regulatory liability and refunded to customers. If the 2021 revenues are lower than the approved plan year level, the difference will be deferred as a regulatory asset and collected from customers. A refund or surcharge factor will be calculated for each class based on the deferral amount and the current sales forecast. These factors will be placed on customer bills effective April 1, 2022 for 12 months.

B. Property Tax and Capital True-Ups

Xcel's petition also requests to continue two other true-ups currently in effect. The proposed property tax true-up would apply the same methodology of annually adjusting for actual property tax expenses as has been in effect through the Company's 2015 multiyear rate plan and as approved by the Commission in the Company's 2020 true-up proposal. The proposed capital expenses true-up would likewise apply the same methodology as approved in the Company's multiyear rate plan for the 2017-2019 period and as approved by the Commission in 2020. The capital true-up is asymmetrical, meaning that ratepayers would receive a refund if applicable capital expenditures fall below the baseline established in the last rate proceeding, but are protected from recovery of capital expenditures above the benchmark.

C. Rate Mitigation

Recognizing that there are potential ratepayer risks associated with continuing the true-ups and avoiding a general rate case proceeding, the Company proposed mitigating the impacts of the Stay Out Proposal by subsequently modifying its initial proposal with additional measures, including: a commitment to not seek recovery of pandemic-related costs; a commitment to pay the full amount of bill credits under the Company's residential payment plan credit program; and a proposal to recover the projected demand-metered C&I customers' sales true-up surcharge over 21 months, instead of 12. Altogether, the Company committed to taking the following steps:

¹² The TCJA is a 2017 federal tax law affecting tax rates.

- Commit to not seeking recovery of any pandemic-related costs, including bad debt costs, that are currently deferred and being tracked in a separate docket; the Company will withdraw its request for deferral in that docket.¹³
- Commit to paying the full \$17.5 million of bill credits proposed in the residential payment plan credit program filed in a separate Commission docket,¹⁴ on the condition that should any portion of the \$17.5 million not be used to pay for the costs of the program, the remaining amount will be used to fund similar programs at the Commission’s discretion.
- Recover sales through its sales true-up from the Demand class over 21, not 12, months beginning April 2022.
- Apply an earnings cap to the Company’s Minnesota jurisdictional earnings for 2021 at 9.06 percent return-on-equity (ROE), meaning that if Xcel’s ROE exceeds 9.06, Xcel will return the excess earnings via the 2021 sales true-up.
- Apply approximately \$53 million in an accelerated return of Accumulated Deferred Income Tax (ADIT) to reduce the \$171 million forecasted Demand class sales deficiency.¹⁵

The Company emphasized that its Stay Out Proposal is not a request to extend its 2015 multiyear rate plan, which authorized the Company to preserve the status quo at the conclusion of its plan, but rather, is offered as an alternative to taking up a rate case at this time. Under the Stay Out Proposal, base rates would be held flat in 2021 and there would be no 2021 true-up surcharge applied to customers’ bills prior to April 2022; recovery of the surcharge to the Demand class would be applied over the following 21-month billing period.

Xcel also maintained that the Stay Out Proposal better protects ratepayers not only by eliminating the immediate rate impacts of a general rate case but also by avoiding the litigation of a rate case, which enables the Company and other parties and stakeholders participating in dockets involving pandemic-related mitigation efforts to more squarely focus their resources on those important policy decisions. Together, these features provide significant benefits to customers most directly affected by the pandemic.

¹³ *In the Matter of the Petition of the Minnesota Rate Regulated Electric and Gas Utilities for Authorization to Track Expenses Resulting from the Effects of the COVID-19 and Record and Defer Such Expenses into a Regulatory Asset*, Docket No. E,G-999/M-20-427, Order Approving Accounting Request and Taking Other Action Related to COVID-19 Pandemic (May 22, 2020).

¹⁴ *In the Matter of an Xcel Payment Plan Credit Proposal*, Docket No. E-002/M-20-760.

¹⁵ ADIT accounts for tax liability between the time when reported income tax obligation is accrued and when the income tax obligation is paid. Due to changes in federal tax law affecting utilities’ tax rates, Xcel accrued over \$100 million in unprotected ADIT expenditures from all customer classes that will no longer be due, resulting in what is described as unprotected excess ADIT. The return of the Company’s unprotected ADIT balance is subject to regulatory approval. Xcel proposed an accelerated return of a portion of that balance to reduce the rate impact of the Stay Out Proposal on the Demand class.

In response to comments that the Stay Out Proposal is particularly unfavorable for the Demand class, the Company asserted that the proposal appropriately balances the consequences for all customer classes, that further reductions to one class of customers does not automatically make the proposal better for all classes, and that in the absence of approval of the proposed true-ups, the Company would seek to recover sales declines through interim rates. For these reasons, the Company stated that the Stay Out Proposal best balances the impacts to all customer classes, with rate mitigation commitments that further reduce the rate impacts to other customer classes.

According to the Company, lower sales to the Demand class in 2021 also suggest that some of that reduction may be pandemic-related and therefore anomalous, making the data potentially less useful for a 2021 rate case test year. Instead, the Company stated that the benefits of extending the true-up by one year, in light of the pandemic, along with proposed mitigation efforts, including those that reduce impacts to the Demand class, make the Stay Out Proposal consistent with the public interest.

The Company acknowledged that continuation of the sales true-up would shift some of the risk to customers but asserted that as a fully regulated cost-of-service utility, the Company is allowed to recover its costs, which would be capped under its Stay Out Proposal with an earnings test that would return to customers any revenues exceeding its 9.06 percent ROE benchmark.

Finally, Xcel explained that although its current proposal includes the use of accelerated ADIT to mitigate the rate impact to the Demand class, the Commission could instead use ADIT in 2021 once actuals sales to the Demand class are known.

III. Comments Supporting the Stay Out Proposal

A. The OAG

The OAG recommended that the Commission approve Xcel's Stay Out Proposal with several modifications with which Xcel agreed and which would, for example, preserve the asymmetrical cap on the capital true-up and preserve the customer class allocation of the sales true-up consistent with the Company's 2015 multiyear rate plan class-cost-of-service study.

The OAG concurred with Xcel that the Commission has the authority to approve the Stay Out Proposal under applicable law. The proposal does not alter the base rates established in the Company's 2015 multiyear rate plan, which the Commission previously determined to be just and reasonable, consistent with the multiyear rate plan statute.¹⁶

In response to the Department's recommendation that Xcel share the cost of the Demand class sales decline, the OAG stated that it did not oppose such an approach but emphasized that the Demand class revenue loss should not be shifted to the Residential and Small C&I class, an unreasonable outcome for people struggling to feed their families and pay their utility bills as a result of the pandemic.

The OAG also disagreed with assertions that Xcel's sales true-up is no longer working as intended due to the projected surcharge to the Demand class. The OAG explained that the sales true-up was designed to refund or surcharge each class for its change in sales. And although the

¹⁶ Minn. Stat. § 216B.16, subd. 19.

impacts of a true-up are unknown in advance, the OAG maintained that parties understood and accepted the risks of approving Xcel's 2020 true-ups in exchange for the benefits of avoiding a rate case. Based on its analysis of the current Stay Out Proposal, the OAG claimed that the benefits of the proposal are greater when compared to a general rate case, which could result in final rates that are higher than those proposed under the Stay Out Proposal.

Further, the OAG noted that proceeding with a rate case would not avert parties' disputes over how to address the sales decline to the Demand class, an issue that would arise within that context as well. Recognizing the complexity of these issues and the significant use of resources needed to engage in a general rate case, the OAG stated that customers are best served by avoiding a rate case, particularly in light of the pandemic, which is itself a compelling basis for a one-year delay in proceeding with a rate case.

B. The Energy CENTS Coalition

Energy CENTS recommended Commission approval of Xcel's proposal, particularly considering the increased financial hardship caused by the pandemic. Energy CENTS stated that avoiding residential rate increases and refunding revenue to residential customers is more persuasive now than it was in 2019. Energy CENTS also asked the Commission to consider the limited resources of some parties to participate in other Commission proceedings, including, for example, one that is examining the terms of the Company's payment plan credit program proposal, which would benefit from fuller participation by stakeholders with fewer resources if Xcel's rate case were postponed.

C. LIUNA

LIUNA strongly supported Xcel's proposal, stating that it provides immediate relief to those who have been hit hardest by the pandemic and who are most in need of help. LIUNA opposed proceeding with a general rate case, which would allocate an equal share of interim rates across all customer classes, resulting in an unreasonable shift of responsibility for the interim rate increase to other classes due to the decline in Demand sales at a time when residential customers and small businesses are struggling.

LIUNA also stated that larger businesses have generally fared better compared to residential customers and small businesses, but that the Stay Out Proposal's rate mitigation commitments offer effective tools for addressing the concerns raised by the Demand class. In its view, LIUNA stated that Xcel's proposal is clearly reasonable.

D. The Suburban Rate Authority

The Suburban Rate Authority (SRA) recommended approval of Xcel's proposal, particularly considering the potential impact of an interim rate increase on those most vulnerable to the adverse effects of the pandemic. For many customers, an immediate rate increase could be severe, and a potential interim rate refund more than a year later would not protect customers from economic harm such as business losses and disconnection of service.

Noting that municipal demand customers differ from other C&I customers, the SRA supported separating the Other Sales to Public Authority (municipal customers) to calculate the sales true-up. Xcel agreed that municipal customers are unique compared to other Demand-class customers, explaining that their usage is separately forecast in the Other Sales to Public

Authority (OSPA) class in the sales forecast. Xcel therefore concurred with the SRA's recommendation to separate this class for purposes of calculating and applying the sales true-up for this energy load.

The SRA stated that rate relief and stimulus efforts are warranted, and that Xcel's proposal is a better alternative when compared to a general rate case that would result in interim rate increases that could cause rate shock.

E. The Department

The Department concurred that Commission approval of the Stay Out Proposal would not violate the multiyear rate plan statute because base rates would remain in place, consistent with the settlement approved by the Commission in Xcel's 2015 multiyear rate case, which concluded in 2019. Continuation of the proposed true-ups, which authorize adjustments for sales revenue, capital expenses, and property taxes, do not alter base rates and were not proposed by Xcel as an extension of its expired 2015 multiyear rate plan.

The Department expressed measured support for the substance of Xcel's proposal, particularly the sales true-up, recommending conditions to incorporate cost-sharing that would shift an equal portion of the risk of the decline in Demand-class sales to the Company. And although the Company stated that the Department's recommendations were untenable in light of other rate mitigation efforts the Company had offered, the Department maintained its position that a cost-sharing mechanism is reasonable.

In analyzing Xcel's Stay Out Proposal compared to the costs of proceeding with a general rate case, the Department compared the projected sales true-up surcharge to the Demand class with projected final rates in a rate case, assuming Xcel is authorized to recover 52 percent of its initial rate request (the average amount Xcel has received in recent rate cases). By comparison, the Department stated that a sales true-up surcharge would result in a rate increase of approximately 10 percent, while final rates under a general rate case under the Department's scenario are likely to result in a rate increase of approximately 6.5 percent.

The Company's ability to charge customers its rate-of-return on equity makes the increase to the Demand class unreasonable, according to the Department. As a result, the Department supported either a 50-percent cost-sharing mechanism in which costs would be shared equally between the Demand class and the Company, or in the alternative, a cost-sharing mechanism in which all customer classes would share one-third of the cost, the Demand class would share an additional one-third, and the Company would also share one-third. Such an approach, the Department claimed, would better incentivize the Company to address the impacts of the decline in sales to the Demand class.

IV. Comments Opposing the Stay Out Proposal

A. Xcel Large Industrials (XLI)

XLI opposed Xcel's Stay Out Proposal, stating that it would unreasonably apportion the Company's revenue requirement to the Demand class. In particular, XLI claimed that the starting point for the sales true-up is unreasonable, demonstrably overstated, and that Xcel's proposed concessions are insufficient and insignificant with no effective protection for Demand customers.

XLI stated that the anticipated sales true-up would result in a surcharge to the Demand class but in a refund to the Residential class, an unreasonably disproportionate result. XLI recommended adjusting this difference in either Xcel's interim rates proposal in its general rate case or its Stay Out Proposal. But XLI also asserted that the Demand class would be better positioned under interim rates, which may result in a refund to customers if the amount collected in interim rates exceeds the amount approved in final rates.

XLI also argued that the Stay Out Proposal is a violation of the multiyear rate plan statute by enabling Xcel to benefit from a continuing sales true-up that has resulted in a surcharge to the Demand class each year since its approval in the multiyear rate plan. For these reasons, XLI recommended proceeding with a general rate case that would give parties the opportunity to scrutinize Xcel's data anew, ensuring just and reasonable rates.

B. Minnesota Energy Consumers

Minnesota Energy Consumers (MEC) also opposed the Stay Out Proposal, stating that although no party wants the burden of a multiyear rate case, a general rate case proceeding would ensure just and reasonable rates. MEC stated that due to the Stay Out Proposal's disproportionate impact on the Demand class, these customers would be better off under interim rates applied in a general rate proceeding.

MEC stated that if the Commission were to approve the Stay Out Proposal, a cost-sharing approach as initially advocated by the Department is reasonable. MEC also concurred that use of ADIT could further mitigate the impacts of the Stay Out Proposal.

MEC stated that it also opposed use of Demand class revenues to fund the Company's residential payment plan credit program, considering the likely surcharge levels in 2020 and 2021 to the Demand class. In supporting a general rate case, MEC also stated that a contested case offers a greater level of scrutiny of Xcel's data, which is outdated. Class revenue apportionment used to determine the forecast for the sales true-up is based on data from the Company's 2015 multiyear rate plan, resulting in a disproportionate share of costs allocated to the Demand class, according to MEC.

C. The Commercial Group

The Commercial Group echoed comments that the Stay Out Proposal would disproportionately impact the Demand class and stated that filings made by Xcel as part of its general rate case show that the Demand class is subsidizing other customer classes. The Commercial Group recommended that the Commission deny the petition but also stated that if the Commission approved the Stay Out Proposal, it would be reasonable to equally allocate the sales true-up across customer classes and to require Xcel to share in the cost of the sales decline to the Demand class.

V. Commission Action

A. Permissibility of the Stay Out Proposal

As a threshold matter, the Commission is not persuaded that approval of the Stay Out Proposal violates the multiyear rate plan statute,¹⁷ as some parties have claimed. In approving Xcel's 2020 true-ups, the Commission explained that while the statute does not specify what happens to a utility's rates after the conclusion of a multiyear rate plan, Xcel's 2015 multiyear rate plan authorizes rates in effect during the final year of the plan to remain in effect, unless the Company files another multiyear rate plan 60 days prior to the conclusion of the term and proposes new interim rates. This result, the Commission found, was consistent with applicable law and Commission orders determining how utilities subject to a multiyear rate plan should proceed at the conclusion of such a plan.¹⁸

In this case, arguments similar to those raised regarding Xcel's 2020 true-ups have arisen which challenge the Commission's authority to approve Xcel's Stay Out Proposal as an alternative to a general rate case. Minn. Stat. § 216B.16 does not, however, require Xcel to proceed with a rate case at the conclusion of its multiyear rate plan, and the Commission therefore declines to deny the Stay Out Proposal on that basis.

The Commission's decision approving Xcel's 2020 true-ups authorized the true-ups without extending the Company's multiyear rate plan, which ended in 2019. The base rates currently in place were previously found to be just and reasonable at the conclusion of Xcel's 2015 multiyear rate plan and are consistent with the Commission's authority under the multiyear rate plan statute to "by order, establish terms, conditions, and procedures for a multiyear rate plan necessary to implement this section and ensure that rates remain just and reasonable during the course of the plan, including terms and procedures for rate adjustment."¹⁹

As the Commission explained in its prior order, utilities are required to include a description of their proposal for the rates that would apply after the term of their rate plan ends. Xcel did so in its 2015 multiyear rate plan by proposing to maintain the rates in effect during the plan's final year—a proposal the Commission approved, ensuring that rates remain just and reasonable after the conclusion of the multiyear rate plan. The Stay Out Proposal maintains the Company's approved base rates.

B. Approval of the Stay Out Proposal

The fundamental challenge facing the Commission in deciding whether to approve the Stay Out Proposal is how to best balance the interests of all ratepayers with those of the Company in seeking recovery of costs, a complexity that is not solved by requiring the Company to proceed with a general rate case. To the contrary, parties have already begun asserting differing positions on how the Commission should resolve ratepayer disputes within the context of a general rate case.

¹⁷ *Id.*

¹⁸ *In the Matter of Northern States Power Company d/b/a Xcel Energy for Approval of True-Up Mechanisms*, Docket No. E-002/M-19-688, Order Approving True-Ups and Requiring Xcel to Withdraw its Notice of Change in Rates and Interim Rate Petition, at 7-8 (March 13, 2020).

¹⁹ Minn. Stat. § 216B.16, subd. 19.

After careful consideration of the issues raised in this case, the Commission is persuaded that, on balance, granting the Company's petition with modifications offers the broadest protection to ratepayers as a whole and will ensure just and reasonable rates. Avoiding an immediate interim rate increase for any customer class reduces the risk of additional economic hardship and service disconnections to individuals, families, and businesses already experiencing financial strain as a result of the pandemic. This level of certainty is the most reasonable and equitable course of action under these uniquely compelling and unforeseen circumstances.

While there are important advantages to approving the Stay Out Proposal, the Commission also recognizes the potential risks that the proposal carries for some customers. The Commission will therefore direct Xcel to modify its initial proposal to address those concerns, as described in further detail below.

In response to claims that the Demand class would fare better under a rate case proceeding, the Commission cautions that those assertions do not fully account for the fact that the outcome of either an interim rates decision or a final rates decision is speculative. Any potential reduction to either interim or final rates is unknown. And, while the Company's interim rates proposal could be reduced if the Commission found exigent circumstances, it is unclear to what extent and in what manner interim rates would be reduced in such a scenario.

As stated above, Xcel has offered substantial mitigation measures to reduce the impacts associated with its Stay Out Proposal. The Commission will require the Company to implement these measures, which reasonably shift some of the risk to the Company, reduce costs for ratepayers, mitigate the impacts to the Demand class, and provide economic protections for those most in need during the pandemic. They include the following:

- Commit to not seeking recovery of any pandemic-related costs, including bad debt costs, that are currently deferred and being tracked in a separate docket; the Company will withdraw its request for deferral in that docket.²⁰
- Commit to paying the full \$17.5 million of bill credits proposed in the residential payment plan credit program on the condition that should any portion of the \$17.5 million not be used to pay for the costs of the program, the remaining amount will be used to fund similar programs at the Commission's discretion.
- Recover sales through its sales true-up from the Demand class over 21, not 12, months beginning April 2022.
- Apply an earnings cap to the Company's Minnesota jurisdictional earnings for 2021 at 9.06 percent ROE, meaning that if Xcel's ROE is greater than 9.06, Xcel will return the excess earnings via the 2021 sales true-up.

²⁰ *In the Matter of the Petition of the Minnesota Rate Regulated Electric and Gas Utilities for Authorization to Track Expenses Resulting from the Effects of the COVID-19 and Record and Defer Such Expenses into a Regulatory Asset*, Docket No. E,G-999/M-20-427, Order Approving Accounting Request and Taking Other Action Related to COVID-19 Pandemic (May 22, 2020).

Although some parties claimed that these commitments provide insufficient protection to the Demand class in particular, the Commission is not persuaded that proceeding with a general rate case is more likely to provide greater benefits to the Demand class or to ratepayers as a whole. And while the Department's cost-sharing approach is inviting, it does not appear to be a viable alternative that the Company could accept, thereby leading the Company to proceed with a general rate case that does not, on balance, offer greater protections to ratepayers than the benefits of the Stay Out Proposal.

After considering whether to authorize the Company's proposal to further offset the impact of the sales true-up using accelerated excess ADIT, the Commission is not persuaded that use of ADIT, as initially proposed by Xcel, is necessarily the best use of the excess. The Commission will therefore decline, at this time, to apply accelerated excess ADIT to the sales true-up. This decision gives the Commission additional time to consider the best and most effective application of ADIT. The Commission will, however, require Xcel to provide an option to calculate sales true-ups for Demand customer groups separately for each of the Demand classes based on the sales changes for that specific class when Xcel seeks recovery of any 2021 sales true-up amounts. Similarly, the Commission will approve Xcel's request to separately calculate the OSPA Class's true-up. These requirements will facilitate a clearer understanding of the rate impacts to the various customer groups within the Demand class and perhaps inform further rate mitigation measures, including the use of ADIT.

For all these reasons, the Commission is persuaded that Xcel's Stay Out Proposal is reasonable, equitable, and consistent with the public interest and will therefore approve the proposal, as modified and as set forth in the ordering paragraphs below, on the condition that the Company comply with the commitments described herein and withdraw its general rate case filing.

VI. Additional Requirements

Although the Department and the OAG initially expressed reservations about Xcel's proposal to delay its Nuclear Decommissioning Trust (NDT) by one year, they ultimately concurred that it would be reasonable to do so. Xcel stated that a one-year delay in the accrual from its current \$14 million level would increase the annual accrual, beginning in 2022, by \$1.28 million and would therefore not create significant burdens for customers. The Commission concurs with Xcel and will require the Company to maintain the annual decommissioning accrual, during 2021, at the \$14,030,831 per-year amount currently included in base rates and to maintain end-of-life accrual at the currently-approved amount of \$2,087,026.

The SRA recommended that if the Stay Out Proposal is extended, it would be reasonable to apply a one-year extension to the terms of an agreement between the SRA, the City of Minneapolis, and Xcel, consistent with the settlement in Xcel's 2015 multiyear rate plan. Under the agreement, Xcel defers as a regulatory asset the revenue requirements directly related to actual light-emitting diode (LED) streetlight capital additions during the term of the settlement, without interest, and credits LED street-lighting revenues against the deferral. The Commission concurs that, under the circumstances, an extension of the settlement terms is reasonable and will therefore approve Xcel's continuation of the LED deferral for one additional year.

ORDER

1. Xcel's Stay Out Proposal is approved as modified on the condition that Xcel comply with the commitments included in this order and withdraw its rate case filed in Docket No. E-002/GR-20-723.
2. Xcel's request to extend the 2021 sales true-up for all customers classes is approved.
3. Xcel's request to separately calculate the Other Sales to Public Authority (OSPA) Class's true-up is approved.
4. When Xcel seeks recovery of any 2021 sales true-up amounts, the Company must provide an option to calculate sales true-ups for Demand customers separately for each of the Demand classes based on the sales changes for that specific class.
5. The Commission does not authorize use of ADIT for the 2021 sales true-up.
6. Xcel must use actual 2021 sales revenues when calculating its 2021 sales true-up amount and must remove the language that states that the true-up will include all discounts and incentive rates approved by the Commission.
7. The recovery period for any Demand class surcharge is extended from 12 to 21 months.
8. Xcel's Minnesota jurisdictional earnings for 2021 are capped at a 9.06 percent ROE, and if Xcel's ROE is greater than 9.06, Xcel must return the excess earnings via the 2021 sales true-up.
9. Xcel's request to extend its capital and property tax true-ups for all customer classes is approved, with the exclusion of all Tranche 1 and electric vehicle rebates from the calculation.
10. For 2021, Xcel must maintain the annual decommissioning accrual at the \$14,030,831 per year amount currently included in base rates and maintain end-of-life accrual at the currently approved amount of \$2,087,026.
11. Xcel's continuation of the LED deferral is approved for one additional year (through 2021).
12. The Commission accepts Xcel's commitment to not seek recovery of all pandemic-related costs, including bad debt costs, that are deferred and being tracked pursuant to the Order Approving Accounting Request and Taking Other Action Related to COVID-19 Pandemic issued on May 22, 2020 in Docket No. E,G-999/M-20-427, and to withdraw its request for deferral in that docket.
13. The Commission accepts Xcel's commitment to pay for \$17.5 million of bill credits proposed in the residential payment plan credit program filed in Docket No. E-002/M-20-760. Should any portion of the \$17.5 million not be used to pay for the costs of the program, Xcel commits the remaining funds to be used to fund similar programs at the Commission's discretion.

14. Xcel must file revised tariff language and any other documentation as needed to demonstrate compliance with this order.
15. The Commission hereby delegates authority to the Executive Secretary to vary time periods and approve notices for the duration of the proceeding in this docket and any other proceeding that stems from this matter.
16. This order shall become effective immediately.

BY ORDER OF THE COMMISSION



Will Seuffert
Executive Secretary



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CERTIFICATE OF SERVICE

I, Leesa Norton, hereby certify that I have this day, served a true and correct copy of the following document to all persons at the addresses indicated below or on the attached list by electronic filing, electronic mail, courier, interoffice mail or by depositing the same enveloped with postage paid in the United States mail at St. Paul, Minnesota.

**Minnesota Public Utilities Commission
ORDER APPROVING TRUE-UPS WITH MODIFICATIONS AND REQUIRING
XCEL TO WITHDRAW ITS NOTICE OF CHANGE IN RATES AND INTERIM
RATE PETITION**

Docket Number **E-002/M-20-743**

Dated this 2nd day of April, 2021

/s/ Leesa Norton

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| Cody | Chilson | cchilson@greatermngas.com | Greater Minnesota Gas, Inc. & Greater MN Transmission, LLC | 1900 Cardinal Ln PO Box 798 Faribault, MN 55021 | Electronic Service | No | OFF_SL_20-743_Official |
| Ray | Choquette | rchoquette@agp.com | Ag Processing Inc. | 12700 West Dodge Road PO Box 2047 Omaha, NE 68103-2047 | Electronic Service | No | OFF_SL_20-743_Official |
| John | Coffman | john@johncoffman.net | AARP | 871 Tuxedo Blvd. St. Louis, MO 63119-2044 | Electronic Service | No | OFF_SL_20-743_Official |

| First Name | Last Name | Email | Company Name | Address | Delivery Method | View Trade Secret | Service List Name |
|----------------|--------------------|------------------------------------|------------------------------------|--|--------------------|-------------------|------------------------|
| Generic Notice | Commerce Attorneys | commerce.attorneys@agate.mn.us | Office of the Attorney General-DOC | 445 Minnesota Street Suite 1400 St Paul, MN 55101 | Electronic Service | Yes | OFF_SL_20-743_Official |
| Riley | Conlin | riley.conlin@stoel.com | Stoel Rives LLP | 33 S. 6th Street Suite 4200 Minneapolis, MN 55402 | Electronic Service | No | OFF_SL_20-743_Official |
| Brooke | Cooper | bcooper@allete.com | Minnesota Power | 30 W Superior St Duluth, MN 55802 | Electronic Service | No | OFF_SL_20-743_Official |
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| George | Crocker | gwilic@nawo.org | North American Water Office | PO Box 174 Lake Elmo, MN 55042 | Electronic Service | No | OFF_SL_20-743_Official |
| Bridget | Dockter | Bridget.Dockter@xcelenergy.com | | N/A | Electronic Service | No | OFF_SL_20-743_Official |
| Marie | Doyle | marie.doyle@centerpointenergy.com | CenterPoint Energy | 505 Nicollet Mall P.O. Box 59038 Minneapolis, MN 554590038 | Electronic Service | No | OFF_SL_20-743_Official |
| Michelle | Dreier | mdreier@electricalassociations.com | | N/A | Electronic Service | No | OFF_SL_20-743_Official |
| Ron | Elwood | relwood@mmlsap.org | Mid-Minnesota Legal Aid | 2324 University Ave Ste 101 Saint Paul, MN 55114 | Electronic Service | No | OFF_SL_20-743_Official |
| James C. | Erickson | jericksonkbc@gmail.com | Kelly Bay Consulting | 17 Quechee St Superior, WI 54880-4421 | Electronic Service | No | OFF_SL_20-743_Official |

| First Name | Last Name | Email | Company Name | Address | Delivery Method | View Trade Secret | Service List Name |
|------------|------------|----------------------------------|--|---|--------------------|-------------------|------------------------|
| John | Farrell | jfarrell@liser.org | Institute for Local Self-Reliance | 2720 E. 22nd St Institute for Local Self-Reliance Minneapolis, MN 55406 | Electronic Service | No | OFF_SL_20-743_Official |
| Eric | Fehlhaber | efeihhaber@dakotaelectric.com | Dakota Electric Association | 4300 220th St W Farmington, MN 55024 | Electronic Service | No | OFF_SL_20-743_Official |
| Sharon | Ferguson | sharon.ferguson@state.mn.us | Department of Commerce | 85 7th Place E Ste 280 Saint Paul, MN 551012198 | Electronic Service | No | OFF_SL_20-743_Official |
| Darryl | Fuentes | energy@usg.com | USG Corporation | 550 W Adams St Chicago, IL 60661 | Electronic Service | No | OFF_SL_20-743_Official |
| Brian | Gardow | bgardow@greatermingas.com | Greater Minnesota Gas, Inc. & Greater MN Transmission, LLC | 1900 Cardinal Ln PO Box 798 Faribault, MN 55021 | Electronic Service | No | OFF_SL_20-743_Official |
| James | Garness | james.r.garness@xcelenergy.com | | N/A | Electronic Service | No | OFF_SL_20-743_Official |
| Edward | Garvey | edward.garvey@AESLconsulting.com | AESL Consulting | 32 Lawton St Saint Paul, MN 55102-2617 | Electronic Service | No | OFF_SL_20-743_Official |
| Bruce | Gerhardson | bgerhardson@otpcoco.com | Otter Tail Power Company | PO Box 496 215 S Cascade St Fergus Falls, MN 565380496 | Electronic Service | No | OFF_SL_20-743_Official |
| Anita | Grace | anita@gracemulticultural.com | GRACE Multicultural | 12959 196th LN NW Elk River, MN 55330 | Electronic Service | No | OFF_SL_20-743_Official |
| Bill | Grant | billgrant@minncap.org | Minnesota Community Action Partnership | MCIT Building 100 Empire Dr Ste 202 St. Paul, MN 55103 | Electronic Service | No | OFF_SL_20-743_Official |

| First Name | Last Name | Email | Company Name | Address | Delivery Method | View Trade Secret | Service List Name |
|------------|-----------|------------------------------|----------------------------------|---|--------------------|-------------------|------------------------|
| Todd J. | Guerrero | todd.guerrero@kutakrock.com | Kutak Rock LLP | Suite 1750 220 South Sixth Street Minneapolis, MN 554021425 | Electronic Service | No | OFF_SL_20-743_Official |
| Annete | Henkel | mui@mmutilityinvestors.org | Minnesota Utility Investors | 413 Wacouta Street #230 St Paul, MN 55101 | Electronic Service | No | OFF_SL_20-743_Official |
| Shane | Henriksen | shane.henriksen@enbridge.com | Enbridge Energy Company, Inc. | 1409 Hammond Ave FL 2 Superior, WI 54880 | Electronic Service | No | OFF_SL_20-743_Official |
| Corey | Hintz | chintz@dakotaelectric.com | Dakota Electric Association | 4300 220th Street Farmington, MN 550249583 | Electronic Service | No | OFF_SL_20-743_Official |
| Michael | Hoppe | lu23@ibew23.org | Local Union 23, I.B.E.W. | 445 Eina Street Ste. 61 St Paul, MN 55106 | Electronic Service | No | OFF_SL_20-743_Official |
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| Lori | Hoyum | lhoyum@mnpower.com | Minnesota Power | 30 West Superior Street Duluth, MN 55802 | Electronic Service | No | OFF_SL_20-743_Official |
| Travis | Jacobson | travis.jacobson@mdu.com | Great Plains Natural Gas Company | 400 N 4th St Bismarck, ND 58501 | Electronic Service | No | OFF_SL_20-743_Official |
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| Richard | Johnson | Rick.Johnson@lawmoss.com | Moss & Barnett | 150 S. 5th Street Suite 1200 Minneapolis, MN 55402 | Electronic Service | No | OFF_SL_20-743_Official |

| First Name | Last Name | Email | Company Name | Address | Delivery Method | View Trade Secret | Service List Name |
|------------|------------------|---------------------------------|--|---|--------------------|-------------------|------------------------|
| Sarah | Johnson Phillips | sarah.phillips@stoel.com | Stoel Rives LLP | 33 South Sixth Street Suite 4200 Minneapolis, MN 55402 | Electronic Service | No | OFF_SL_20-743_Official |
| Mark J. | Kaufman | mkaufman@ibewlocal949.org | IBEW Local Union 949 | 12908 Nicollet Avenue South Burnsville, MN 55337 | Electronic Service | No | OFF_SL_20-743_Official |
| Thomas | Koehler | TGK@IBEW160.org | Local Union #160, IBEW | 2909 Anthony Ln St Anthony Village, MN 55418-3238 | Electronic Service | No | OFF_SL_20-743_Official |
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| Nicolle | Kupser | nkupser@greatermngas.com | Greater Minnesota Gas, Inc. & Greater MN Transmission, LLC | 1900 Cardinal Ln PO Box 798 Faribault, MN 55021 | Electronic Service | No | OFF_SL_20-743_Official |
| Peder | Larson | plarson@larkinhoffman.com | Larkin Hoffman Daly & Lindgren, Ltd. | 8300 Norman Center Drive Suite 1000 Bloomington, MN 55437 | Electronic Service | No | OFF_SL_20-743_Official |
| Douglas | Larson | dlarson@dakotaelectric.com | Dakota Electric Association | 4300 220th St W Farmington, MN 55024 | Electronic Service | No | OFF_SL_20-743_Official |
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| Amber | Lee | Amber.Lee@centerpointenergy.com | CenterPoint Energy | 505 Nicollet Mall Minneapolis, MN 55402 | Electronic Service | No | OFF_SL_20-743_Official |

| First Name | Last Name | Email | Company Name | Address | Delivery Method | View Trade Secret | Service List Name |
|------------|---------------|-------------------------------|-------------------------------------|--|--------------------|-------------------|------------------------|
| Annie | Levenson Falk | annief@cupminnesota.org | Citizens Utility Board of Minnesota | 332 Minnesota Street, Suite W1360 St Paul, MN 55101 | Electronic Service | No | OFF_SL_20-743_Official |
| Ryan | Long | ryan.j.long@xcelenergy.com | Xcel Energy | 414 Nicollet Mall 401 8th Floor Minneapolis, MN 55401 | Electronic Service | No | OFF_SL_20-743_Official |
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| Kavita | Maini | kmaini@wi.rr.com | KM Energy Consulting, LLC | 961 N Lost Woods Rd Oconomowoc, WI 53066 | Electronic Service | No | OFF_SL_20-743_Official |
| Pam | Marshall | pam@energycents.org | Energy CENTS Coalition | 823 7th St E St Paul, MN 55106 | Electronic Service | No | OFF_SL_20-743_Official |
| Brian | Meloy | brian.meloy@stinson.com | STINSON LLP | 50 S 6th St Ste 2600 Minneapolis, MN 55402 | Electronic Service | No | OFF_SL_20-743_Official |
| Joseph | Meyer | joseph.meyer@ag.state.mn.us | Office of the Attorney General-RUD | Bremer Tower, Suite 1400 445 Minnesota Street St Paul, MN 55101-2131 | Electronic Service | No | OFF_SL_20-743_Official |
| Stacy | Miller | stacy.miller@minneapolisn.gov | City of Minneapolis | 350 S. 5th Street Room M 301 Minneapolis, MN 55415 | Electronic Service | No | OFF_SL_20-743_Official |
| David | Moeller | dmoeller@galleto.com | Minnesota Power | 30 W Superior St Duluth, MN 558022093 | Electronic Service | No | OFF_SL_20-743_Official |
| Andrew | Moratzka | andrew.moratzka@stoel.com | Stoel Rives LLP | 33 South Sixth St Ste 4200 Minneapolis, MN 55402 | Electronic Service | No | OFF_SL_20-743_Official |

| First Name | Last Name | Email | Company Name | Address | Delivery Method | View Trade Secret | Service List Name |
|------------|-----------|---------------------------------------|--|--|--------------------|-------------------|------------------------|
| David | Niles | david.niles@avantenergy.com | Minnesota Municipal Power Agency | 220 South Sixth Street Suite 1300 Minneapolis, Minnesota 55402 | Electronic Service | No | OFF_SL_20-743_Official |
| Samantha | Norris | samanthanorris@alliantenergy.com | Interstate Power and Light Company | 200 1st Street SE PO Box 351 Cedar Rapids, IA 524060351 | Electronic Service | No | OFF_SL_20-743_Official |
| Matthew | Olsen | molsen@olpco.com | Otter Tail Power Company | 215 South Cascade Street Fergus Falls, MN 56537 | Electronic Service | No | OFF_SL_20-743_Official |
| Carol A. | Overland | overland@legalelectric.org | Legalelectric - Overland Law Office | 1110 West Avenue Red Wing, MN 55066 | Electronic Service | No | OFF_SL_20-743_Official |
| John | Pacheco | johnpachecojr@gmail.com | | N/A | Electronic Service | No | OFF_SL_20-743_Official |
| Greg | Palmer | gpalmier@greatermngas.com | Greater Minnesota Gas, Inc. & Greater MN Transmission, LLC | 1900 Cardinal Ln PO Box 798 Faribault, MN 55021 | Electronic Service | No | OFF_SL_20-743_Official |
| Ben | Passer | Passer@fresh-energy.org | Fresh Energy | 408 St. Peter Street Ste 220 Saint Paul, MN 55102 | Electronic Service | No | OFF_SL_20-743_Official |
| Jose | Perez | jose@hispanicsinenergy.com | | 1017 L Street #719 Sacramento, CA 95814 | Electronic Service | No | OFF_SL_20-743_Official |
| Jennifer | Peterson | jipeterson@minpower.com | Minnesota Power | 30 West Superior Street Duluth, MN 55802 | Electronic Service | No | OFF_SL_20-743_Official |
| Catherine | Phillips | Catherine.Phillips@wecenergygroup.com | Minnesota Energy Resources | 231 West Michigan St Milwaukee, WI 53203 | Electronic Service | No | OFF_SL_20-743_Official |

| First Name | Last Name | Email | Company Name | Address | Delivery Method | View Trade Secret | Service List Name |
|----------------|--------------------------------|--------------------------------------|---|---|--------------------|-------------------|------------------------|
| Kevin | Pranis | kpranis@lunagroc.com | Laborers' District Council of MN and ND | 81 E Little Canada Road St Paul, Minnesota 55117 | Electronic Service | No | OFF_SL_20-743_Official |
| Generic Notice | Residential Utilities Division | residential.utilities@ag.state.mn.us | Office of the Attorney General-RUD | 1400 BRM Tower 445 Minnesota St St Paul, MN 551012131 | Electronic Service | Yes | OFF_SL_20-743_Official |
| Kevin | Reuther | kreuther@mncenter.org | MN Center for Environmental Advocacy | 26 E Exchange St, Ste 206 St Paul, MN 551011667 | Electronic Service | No | OFF_SL_20-743_Official |
| Susan | Romans | sromans@allete.com | Minnesota Power | 30 West Superior Street Legal Dept Duuth, MN 55802 | Electronic Service | No | OFF_SL_20-743_Official |
| Richard | Savelkoul | rsavelkoul@martinsquires.com | Martin & Squires, P.A. | 332 Minnesota Street Ste W2750 St Paul, MN 55101 | Electronic Service | No | OFF_SL_20-743_Official |
| Larry L. | Schedin | Larry@LLSResources.com | LLS Resources, LLC | 332 Minnesota St, Ste W1390 St Paul, MN 55101 | Electronic Service | No | OFF_SL_20-743_Official |
| Elizabeth | Schmiesing | eschmiesing@winthrop.com | Winthrop & Weinstine, P.A. | 225 South Sixth Street Suite 3500 Minneapolis, MN 55402 | Electronic Service | No | OFF_SL_20-743_Official |
| Will | Seuffert | Will.Seuffert@state.mn.us | Public Utilities Commission | 121 7th PI E Ste 350 Saint Paul, MN 55101 | Electronic Service | Yes | OFF_SL_20-743_Official |
| Janet | Shaddix Elling | jshaddix@janeshaddix.com | Shaddix And Associates | 7400 Lyndale Ave S Ste 190 Richfield, MN 55423 | Electronic Service | No | OFF_SL_20-743_Official |

| First Name | Last Name | Email | Company Name | Address | Delivery Method | View Trade Secret | Service List Name |
|------------|------------|------------------------------------|--|---|--------------------|-------------------|------------------------|
| Colleen | Spiorski | Colleen.Spiorski@weenergygroup.com | Minnesota Energy Resources Corporation | 700 North Adams St Green Bay, WI 54307 | Electronic Service | No | OFF_SL_20-743_Official |
| Ken | Smith | ken.smith@districtenergy.com | District Energy St. Paul Inc. | 76 W Kellogg Blvd St. Paul, MN 55102 | Electronic Service | No | OFF_SL_20-743_Official |
| Peggy | Sorum | peggy.sorum@centerpointenergy.com | CenterPoint Energy | 505 Nicollet Mall Minneapolis, MN 55402 | Electronic Service | No | OFF_SL_20-743_Official |
| Jamez | Staples | jstaples@renewablepartners.com | Renewable Energy Partners | 3033 Excelsior Blvd S Minneapolis, MN 55416 | Electronic Service | No | OFF_SL_20-743_Official |
| Byron E. | Starns | byron.starns@stinson.com | STINSON LLP | 50 S 6th St Ste 2600 Minneapolis, MN 55402 | Electronic Service | No | OFF_SL_20-743_Official |
| Richard | Stasik | richard.stasik@weenergygroup.com | Minnesota Energy Resources Corporation (HOLDING) | 231 West Michigan St - P321 Milwaukee, WI 53203 | Electronic Service | No | OFF_SL_20-743_Official |
| Kristin | Stastny | kstastny@taftlaw.com | Taft Stettinius & Hollister LLP | 2200 IDS Center 80 South 8th St Minneapolis, MN 55402 | Electronic Service | No | OFF_SL_20-743_Official |
| Cary | Stephenson | cStephenson@otpc.com | Otter Tail Power Company | 215 South Cascade Street Fergus Falls, MN 56537 | Electronic Service | No | OFF_SL_20-743_Official |
| James M | Strommen | jstrommen@kennedy-graven.com | Kennedy & Graven, Chartered | 150 S 5th St Ste 700 Minneapolis, MN 55402 | Electronic Service | No | OFF_SL_20-743_Official |
| Eric | Swanson | eswanson@winthrop.com | Winthrop & Weinstine | 225 S 6th St Ste 3500 Capella Tower Minneapolis, MN 554024629 | Electronic Service | No | OFF_SL_20-743_Official |

| First Name | Last Name | Email | Company Name | Address | Delivery Method | View Trade Secret | Service List Name |
|------------|------------|-------------------------------------|--|--|--------------------|-------------------|------------------------|
| Lynnette | Sweet | Regulatory.records@xcelenergy.com | Xcel Energy | 414 Nicollet Mall FL 7 Minneapolis, MN 554011993 | Electronic Service | Yes | OFF_SL_20-743_Official |
| Stuart | Tommerdahl | stommerdahl@otpc.com | Otter Tail Power Company | 215 S Cascade St PO Box 496 Fergus Falls, MN 56537 | Electronic Service | No | OFF_SL_20-743_Official |
| Thomas | Tynes | jjazynka@energyfreedomcoalition.com | Energy Freedom Coalition of America | 101 Constitution Ave NW Ste 525 East Washington, DC 20001 | Electronic Service | No | OFF_SL_20-743_Official |
| Analeisha | Vang | avang@minpower.com | Minnesota Power | 30 W Superior St Duluth, MN 558022093 | Electronic Service | No | OFF_SL_20-743_Official |
| Lisa | Veith | lisa.veith@ci.stpaul.mn.us | City of St. Paul | 400 City Hall and Courthouse 15 West Kellogg Blvd. St. Paul, MN 55102 | Electronic Service | No | OFF_SL_20-743_Official |
| Samantha | Williams | swilliams@nrdc.org | Natural Resources Defense Council | 20 N. Wacker Drive Ste 1600 Chicago, IL 60606 | Electronic Service | No | OFF_SL_20-743_Official |
| Joseph | Windler | jwindler@winthrop.com | Winthrop & Weinstein | 225 South Sixth Street, Suite 3500 Minneapolis, MN 55402 | Electronic Service | No | OFF_SL_20-743_Official |
| Patrick | Zomer | Pat.Zomer@lawmoss.com | Moss & Barnett a Professional Association | 150 S. 5th Street, #1200 Minneapolis, MN 55402 | Electronic Service | No | OFF_SL_20-743_Official |

ENCLOSURE 6

ANNUAL ACCRUAL SUMMARY – ITEMIZED TRUST FUND BALANCES

2 pages follow

NSP-Minnesota
NRC Biennial Trust Funding Status Report
Trust Fund Balance - By Components
December 31, 2012

Balances as of January 01, 2021

| <u>External Qualified</u> | Book Value | | | Market Adjustment | | | Market Value | | | All Units |
|----------------------------|-------------|-------------|-------------|-------------------|-------------|-------------|---------------|-------------|-------------|---------------|
| | Monti | PI1 | PI2 | Monti | PI1 | PI2 | Monti | PI1 | PI2 | |
| Radiological | 499,771,778 | 386,972,418 | 376,075,799 | 261,573,397 | 216,294,627 | 209,302,598 | 761,345,175 | 603,267,045 | 585,378,397 | 1,949,990,617 |
| Spent Fuel-Operations | 269,848,098 | 54,671,361 | 97,096,107 | 141,234,633 | 30,558,048 | 54,038,222 | 411,082,731 | 85,229,409 | 151,134,329 | 647,446,469 |
| Spent Fuel-Decommissioning | 5,467,225 | 2,674,183 | 2,750,984 | 2,861,467 | 1,494,710 | 1,531,043 | 8,328,692 | 4,168,892 | 4,282,027 | 16,779,611 |
| Site Restoration | 49,890,265 | 16,220,565 | 39,153,139 | 26,111,851 | 9,066,334 | 21,790,431 | 76,002,116 | 25,286,899 | 60,943,571 | 162,232,586 |
| Total | 824,977,365 | 460,538,528 | 515,076,030 | 431,781,348 | 257,413,718 | 286,662,294 | 1,256,758,713 | 717,952,246 | 801,738,324 | 2,776,449,283 |

**Excluded from
NRC calculation**

NSP-Minnesota
NRC Biennial Trust Funding Status Report
Trust Fund Balances - By Jurisdiction
December 31, 2012

Balances as of January 01, 2021

| External Qualified | Book Value | | | Market Adjust | | | Market Value | | |
|--------------------|-------------|-------------|-------------|---------------|-------------|-------------|---------------|-------------|-------------|
| | Monti | PI1 | PI2 | Monti | PI1 | PI2 | Monti | PI1 | PI2 |
| MN Retail | 607,765,632 | 338,659,461 | 378,928,528 | 318,712,388 | 189,804,703 | 211,709,480 | 926,478,020 | 528,464,164 | 590,638,008 |
| ND Retail | 38,499,609 | 25,510,485 | 27,005,367 | 21,759,623 | 14,176,742 | 15,514,479 | 60,259,232 | 39,687,227 | 42,519,846 |
| SD Retail | 26,952,100 | 19,489,930 | 21,737,427 | 14,507,633 | 10,775,936 | 12,218,027 | 41,459,733 | 30,265,866 | 33,955,454 |
| MN FERC | 10,351,225 | 8,327,913 | 7,718,090 | 6,463,398 | 4,989,104 | 4,350,241 | 16,814,623 | 13,317,017 | 12,068,331 |
| WI FERC | 10,941,279 | 6,549,194 | 6,210,620 | 5,900,830 | 1,659,758 | 3,323,812 | 16,842,109 | 8,208,951 | 9,534,432 |
| WI Retail | 130,467,521 | 62,001,545 | 73,475,998 | 64,437,475 | 36,007,475 | 39,546,255 | 194,904,996 | 98,009,021 | 113,022,253 |
| Total | 824,977,365 | 460,538,528 | 515,076,030 | 431,781,348 | 257,413,718 | 286,662,294 | 1,256,758,713 | 717,952,246 | 801,738,324 |